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MONEY'S WORTH

BY

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"NORMAN'S UNIVERSAL CAMBIST," 1897

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Professor Goldwin Smith

With the Author's Compliments
& Good wishes.

August 17th 1899

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MONEY'S WORTH

OR THE

ARITHMETIC OF THE MECHANISM

OF THE

WORLD'S PRESENT INTERCHANGES

OF

SEVEN MONETARY AND CURRENCY INTERMEDIARIES

AND OF ALL OTHER THINGS;

WITH EXERCISES FOR

THE TRAVELLER, THE TRADER, AND THE FINANCIER

BY

JOHN HENRY NORMAN

BEING THE SYSTEMATICALLY ARRANGED ADDENDA OF 1898
AND 1899 TO HIS "UNIVERSAL CAMBIST";
WITH SEVEN NEW TABLES

TO BE OBTAINED FROM

MESSRS. SAMPSON LOW, MARSTON & CO., FETTER LANE, E.C.
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JULY, 1899

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Dedicated

TO

THE MEMORY OF LOCKE

AND TO

JOHN K. INGRAM, LL.D.

AND

PROFESSOR GOLDWIN SMITH, D.C.L.

WHO BY THEIR

INTEREST IN THE SUBJECT AND COMMUNICATIONS

HAVE SPECIALLY ENCOURAGED THE AUTHOR.

ALSO

TO ALL WHO USE MONEY

ESPECIALLY

THE INSTRUCTORS OF YOUTH.

Extract from a Letter by Locke to Mr. Molyneux, dated November 16th, 1695.

"I find everybody almost looks upon it (money) as a mystery; to me there appears none at all in it. 'Tis but stripping it of the cant which all men that talk of it involve it in, and there is nothing easier:—*Lay by the arbitrary names pence and shillings, and consider and speak of it as grains and ounces of silver, and 'tis as easy as telling of twenty.*"

PREFACE

It is intended that fair Paris should make a surpassing display of the fruits of the brains and limbs of men, assisted by all the forces of nature yet brought under his dominion, to commence in April, 1900.

The Exhibition will contain most things both necessary and desirable in human and domestic animal life.

Everything, the thoughts of men in books and material objects exposed, will be priced, and the prices will be those of the countries exposing the goods, or in francs and centimes.

An inhabitant of each country in the world inspecting these things in 1900 should be able to convert the various prices into those of his own country with facility through the information furnished in this pamphlet.

If the world possessed one monetary system, and all prices were definite weights of, say, pure gold in decigrams without any other nomenclature, children could understand all prices at a glance. There would not be anything to explain and therefore no requirement for this pamphlet.

But the world at present has seven monetary and currency systems, the arithmetic and whole working of which are given and exemplified for the traveller, the trader, and the financier herein.

The only true definition of money is, that it is "The standard substance of each country in the form of standard bullion and coin appropriated to currency purposes."

Money thus defined is the most liquid wealth that any one can possess.

Credit embodied in credit instruments is something perfectly different from money. It is not wealth. Credit is a means whereby a person A obtains the possession of the property or wealth of person B, through the assistance of persons C or C

and D., C and D representing the drawee and discounter of the credit instrument, A being the drawer of the same instrument.

Book debts, promises to pay a weight of pure gold embodied in credit instruments are saleable or discountable things, and the fulfilment of the promise or the payment of the book debt are enforceable at law, but because of this credit instruments do not become wealth.

To prove this, take an instance. There are Frs. 25,000 worth of goods being sold over the counter which have passed through the hands of numerous owners in the stages of manufacture from their raw to their finished state.

It is within the experience of present business that credit instruments for more than Frs. 50,000 are in circulation based on the goods which are being sold over the counter.

In this instance of the sale of goods over the counter for Frs. 25,000 and the credit instruments for Frs. 50,000 in circulation founded upon the honest use of credit, the basis of which is the wealth in the goods: can the portion of the world's wealth embodied in the credit instrument be more than the cost of the paper and printing the promises to pay money? The charge that C makes on A for the use of his credit and the interest that D makes by discounting bills are means for promoting individual and national wealth, so long as bankruptcy does not occur to prevent the liquidation of such instruments.

Is it not a monstrous delusion to assert that until these Frs. 50,000 of credit on pieces of paper of no intrinsic worth are liquidated, they are wealth? and upon liquidation or destruction of them the wealth has gone?

The truth is that a credit instrument from a book debt to a state bank note is a promise to pay money, grains of pure gold in this country. The promise is constituted both a credit and a debit instrument. There is to each of such instruments both a payer and payee. By what is called banking facilities, such highly useful but often dangerously abused documents are extinguished by a debit and a credit entry at the same time in books kept for the purpose.

I do not know a single professor of political economy who defines credit as wealth; but I have met with some who assert

that money is not wealth. This latter false teaching results from the jumbling up of money with credit, and writing and speaking of both under the term money, which lands the teachers in hopeless confusion and error.

I would be the last person in the world to belittle the tremendous importance of credit. Without it the world would well nigh go back to barbarism; but at the same time I would have every one put a just estimate upon the paramount importance of the possession of a scientific effective measure of value.

There are two senses to the words "Money's worth." One is: that which is given in exchange for the standard substance presented as a measure of value and a circulating medium, and another, that which gives to money or the standard substance its purchasing power. It is the cost of production of the standard substance which gives it purchasing power. Value-giving factors, which are past and present labour, with or without the payment of rent, and with or without an unearned increment, constitutes the value of gold as of most other things. It is in this latter sense that I use the term Money's worth.

Too much importance cannot be attached to the possession of the knowledge of the simple arithmetic of the world's present mechanism of the interchanges of things. It will in time be recognized as a vastly valuable sociological acquirement, without which no one's education is complete. I would have all young persons exercised in it during their school days.

If an interest in postage stamps has added to the knowledge of geography, much more would an interest in real money and abortive currencies contribute additional interest to the same subject, besides safeguarding the individual against the attacks of unscrupulous money-changers.

Each country in the world should, as speedily as it is prepared for it, be enlightened upon the subjects I have dealt with by means of an illustrated lecture, which could not fail to be of an intensely interesting nature.

I have received most gratifying testimony to the appreciation of my work from experts in the science of money, financiers,

exchange bankers and brokers, merchants and others, to all of whom I desire to offer my heartiest thanks.

I therefore earnestly invite the most serious attention, with unbiassed mind, of every one—especially rulers, statesmen, legislators, and economists—to this analysis of the world's prices and foreign and colonial exchanges of intermediaries; and to the simple arithmetical demonstration to travellers, traders, and financiers of their effects upon the interchanges of things between man and man and community and community.

Sound bases for the construction of monetary systems cannot be expected from those who are totally ignorant of the knowledge possessed both theoretically and practically by the magnates of the money power of the world. Striking evidence of this can be seen in the first 8393 questions put to and answered by twenty-five examinees, of whom ten were either past or present servants of the State, nine were traders and producers, and six were financiers and bankers, before the India Office Committee upon schemes for providing an effective metal monetary system for British India.

Lord Rothschild's evidence, under 133 interrogatories before this Committee, of what financiers have done and can do, of what Governments can and cannot do, and what British India's trade could possibly do or not do, with the absolute requisite of what it must do to provide and keep an effective gold standard, are a few scientific truths among the evidence given under the remaining 8260 questions in the first blue book of 319 pages.

I repeat the suggestion with which I closed my pamphlet upon "British India's Future Standard Currency":—"Whether it is not a pressing need on every one who has the mind for it, especially statesmen and legislators, to do their utmost to probe to the bottom and discover a sound foundation for the world's interchanges of things, and a corrective to the injustice arising from the machinery at present in use?"

I would add that at the end of May a dinner was given in Boston, U.S.A., to Mr. Charles R. Flint—apparently a Trust organizer, or even something more comprehensive—who addressed an assembly of presidents of fourteen local banks, representatives of Trust Companies, and financiers, upon "Industrial Combina-

tion." In an able speech embracing the "march of improvements, benefits of the new era of consolidation, and a danger of the future," he said: "Subsidy-seekers claim that trade follows the flag: merchants know that trade follows the price, and the flag follows the trade." If this be so, how vastly important is it that all who have the ability should understand and teach what the world's present seven different descriptions of prices consist of.

The reader who does not understand but desires to know the chain rule of arithmetic is recommended to read Section II., pp. 35-37, first.

22, Lee Terrace, S.E.,
July, 1899.

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Section I.

THE WORLD'S INTERCHANGES OF THINGS EFFECTED BY MEANS OF A SCIENTIFIC AUTOMATIC GOLD MEDIUM.

Assume that the whole world used the same weights and measures, say the metric. That it is the universal practice that nothing is done by the State to fetter or favour the substance gold. That there is no coinage charge. That each country has an ample amount of gold in currency and reserve for the conduct of its business. Assume further that the nomenclature of money is confined to weight. The intermediary under these conditions would be a scientific automatic gold one, and credit instruments would be converted into gold for the weight expressed upon them without question, delay, or expense, at the will of the holder of them. There would be no prices of intermediaries. Prices would be weights of gold. The exchange of the gold intermediary would be a small percentage more or a small percentage less than a given weight. This percentage variation would be confined to a narrow limit. It would embrace the cost of transmission of gold and a small profit to those who employ a dealer in the exchange. The variation could not well be more than 1 and ½ per cent. between the most distant ports of the earth. It may be fairly asserted that the people of the earth affected by and engaged in intercolonial and international trade number not far short of 1,400,000,000, inhabiting 350 or more distinctive portions of continents and islands. These use, desire, or intend to use one of the two metals, gold and silver, as their standard substance, measure of value, and equivalent in exchange. In

fact, they have long ago appointed definite weights of these substances under various names, such as the pound, the franc, the dollar, for this purpose.

It may be permissible to introduce the following from my "Universal Cambist":—

"**Purchase and Sale of Things in Combination with the Exchange of Intermediaries.**—It should be no difficult matter to one who is accustomed to instruct children to practise them in the interchanges of things between countries using the five great diverse intermediaries, namely, pure gold, pure silver, silver-cum-counter charge, inconvertible paper based on gold, inconvertible paper based on silver. For instance, as one method, get five bags made, one labelled British Isles; in this place a miniature bale of piece goods, and counters to represent grains of gold. Another bag labelled China, in this place a miniature hank of silk and counters to represent taels and cash. Another labelled British India, with a miniature chest of tea and counters to represent fictitious rupees. Another labelled Argentine Republic, with a miniature bag of wheat and paper to represent pesos based on gold. Another bag labelled Columbia, U.S., with a miniature bag of coffee and paper to represent sols based on silver. Taking from the commercial intelligence in the daily papers the prices of goods and the ratios of the day existing between the five intermediaries used in these countries, and applying them to the purchase in one country, and the sale in another of small quantities of the five descriptions of goods mentioned, the combined working of prices and rates of exchange of the five intermediaries could be taught, and should be mastered by youths before they go out into the world."

"The teacher will make himself master of Chapter VI. on the scientific mode of working the foreign and colonial exchanges of the world's present seven intermediaries. We will suppose that the teacher is thoroughly practised in all that this book is intended to impart. Doubtless each will have a method of teaching the mechanism of the interchanges of things, prices, and the exchanges of money and currency intermediaries. Perhaps the writer may be permitted to indicate the steps that

he thinks it may be expedient to take. I. Tear away monetary signs, and expose the things signified. These things are simply either a weight of gold, or a weight of silver as the bases of each of the seven intermediaries. This has been well done by Miss Sharland in her 'Coin of the Realm, What is it?' and children have demonstrated that they can understand and practise it. II. Assume that the whole world has only one substance as its measure of value and ultimate means of payment, also that the whole world has only one measure of weight, say the metric. Prices throughout the whole world would be more or less metric weight of gold. A rate of exchange would be more or less metric weight of gold, and the fluctuation limited to 1 and ½ per cent. on the weight exchanged. International prices for the same classes and qualities of things would be seen and measured at a glance. International and intercolonial exchanges of one intermediary would be as easy of comparison. The mind readily perceives that should this great desideratum ever be accomplished, the imputed mysteries about money, prices, and the foreign and colonial exchanges of intermediaries will have vanished like fog before a strong wind. III. The next step in instruction is to show that there is no mystery about these things, although the world has seven monetary and currency intermediaries, entailing seven different descriptions of prices, and forty-nine different descriptions of exchanges of the seven intermediaries. Pupils must become familiar with the mode of dealing with each intermediary theoretically and practically. The science of and practice with money may possibly in the distant future centre in and around metric weights of pure gold. At present it centres in twenty-five different weights of pure gold and silver, each clothed with confusing monetary signs, and five of the seven intermediaries associated with and smothered by coinage charges, counters, or inconvertible paper, the creation of legislation."

A Masterly Skill in Bullion and Coin.

"A masterly skill in bullion and coin" is the foundation of the science of money, and the key to the world's interchanges

of currency intermediaries, and the exchanges of all other things. He who understands and works the foreign and colonial exchanges of intermediaries, and of all other things by actual or basal weights of the pure standard metal has this skill.

The unit of weight system is the tool to strip monetary signs from weights and to clothe weights with monetary signs. Every one should be proficient in the use of this tool.

There is no natural impediment to every one becoming expert in the use of this tool, and he that is so expert should find it easy to rise to the comprehension of the science of money.

NORMAN'S UNIT OF WEIGHT SYSTEM.

It is to the unit of weight system alone that I owe all I have been able to do towards the enlightenment of the world since 1875 upon the subject of money, currency substitutes, the constituents of prices throughout the world, and the mechanism of the interchanges of things between man and man and community and community.

Fifty years ago, as a practical merchant in Calcutta, I worked sums in connection with produce and currency exchanges by the chain rule. But my experience was confined to one sphere of operation—the trade between India and England. The act of formulation of the unit of weight system for the whole world in 1875, was in itself an expansion of view which has continuously, but slowly, advanced till it has culminated in this present work.

I wish to press the paramount importance of all students making free use of the unit of weight system, whereby weights of standard metal can be clothed with signs and signs can be stripped from weights.

The writer and many others, first of whom, Dr. Linderman, Mint Master of the United States, N.A., in 1875, and later many well-known economists, have found that this most powerful factor is the key to the science of money. This system consists of attaching a monetary sign for one grain

or one decigram of pure gold or pure silver in the chief money of account of each monetary system. This sign for the British Isles, an an example, is thus obtained. The mint issue weight of pure gold in the sovereign is 113·001605 grains: there are 240 pence in a sovereign: the pence divided by the weight gives the monetary sign for one grain.

$$240 \div 113{\cdot}001605 = 2{\cdot}123863 \text{ pence.—Ans.}$$

This sign, used as a divisor of, say, £48 17*s.* 6½*d.*, gives the weight of pure gold indicated by the sign. Used as a multiplier of weight of gold in grains it yields the monetary sign for the same. Thus, fixed pars between gold standard systems can be reached, and fixed pars between silver standard systems. To ascertain absolute pars between a gold and a silver standard system, this factor in conjunction with the ratio very quickly and correctly determines it. Take for the two countries between which it is desired to know the absolute par of exchange, the British Isles and Mexico. Say the ratio between the metals is 24·694. The mint issue weight of pure silver in the peso is 377·181 grains; $377{\cdot}181 \div 24{\cdot}694 = 15{\cdot}28$. This 15·28 is the equivalent in grains of gold to 377·181 grains of silver. 15·28 at 2·12386*d.* gives 32·45*d.* as the absolute par of exchange between the British Isles and Mexico on the ratio given. Check this by weights. In a British sovereign there are 113·001605 grains of pure gold. Divide 15·28 grains by 113·001605 = ·1352 of a sovereign or 32·44*d.*

To find the weight of pure gold indicated by 32·44 pence. Divide 32·44 by 2·123863, and the result is 15·28 grains of pure gold.

To find the French monetary sign for a German mark. Multiply 5·53134 grains of pure gold in the mark by 22·31964 centimes, the French sign for one grain of pure gold, and the answer is 1 franc 23·43 centimes.

RATIO BETWEEN GOLD AND SILVER.

This almost daily fluctuating ratio is one of the most important factors in the exchanges of intermediaries, and should be a prominent quotation in all credit and money market

reports. It is easily determined upon the gold price of pure silver in gold standard countries, and upon the silver price of pure gold in silver standard countries.

As an instance, take the gold price of silver in London at 28 pence per 444 grains of pure silver. There are 36 grains of alloy in the troy ounce of bar silver. The cost of these and the manufacture of the coin are neglected in my system. In the British Isles there is no charge for alloy in, and manufacture of, gold coins. The weight of pure gold indicated by 28 pence must be found; then the 444 grains of silver divided by the weight of pure gold gives the ratio. Thus—

28 pence ÷ 2·123863 pence, the sign for 1 grain of pure gold, gives 13·183 grains of pure gold. Then 444 grains of pure silver divided by 13·183 gives the ratio between the metals at 33·68 parts of silver to 1 part of gold.

By the use of the constant 942·9955 pence which will be found attached to British, Table IV., the same result as the last is obtained by dividing it by 28 pence. 942·9955 ÷ 28 = 33·68 parts of silver to 1 part of gold. This constant represents the value in pence of 444 grains of gold, that is a quantity of gold equal to the weight of pure silver in one ounce of bar silver.

THE FOREIGN AND COLONIAL EXCHANGES.

In answer to the question: What are the component parts of the foreign and colonial exchanges? it may be said that at the present time they are signs which denote weights of pure gold and weights of pure silver between two scientific automatic monetary systems or two effective monetary systems, with more or less of weight of metal as one charge or another is added to or deducted from metal pars.

The three other vastly diverse currency systems, viz. silver-cum-counter-charge, basal gold or inconvertible paper based on gold, and basal silver or inconvertible paper based on silver, have other very heavy percentage charges either added to or deducted from the weight of pure metal.

METHOD WITH ALL CURRENCY EXCHANGES.

This is the manner in which the exchange of currency intermediaries is dealt with under my system.

I. The fluctuating amount of currency in the country originating the operation is quoted for the whole chief money of account of the country operated upon. Thus—

The British Isles upon France—9·47 to 9·55 pence for a franc
France upon the British Isles—25·10 to 25·22 francs for a pound
British India upon the British Isles—11 to 22 rupees for a pound
British Isles upon British India—21·8 to 10 pence for a rupee

II. To find the fixed or absolute pars of exchange.

Fixed Metal Pars of Exchange.—These are different monetary signs for the same weight of one metal, either gold or silver. Take gold. The sovereign at mint issue weight is 113·0016 grains of pure gold; the franc at mint issue weight is 4·4803 grains of pure gold.

I. To ascertain the French monetary sign for the British pound, the sum is—

113·0016 ÷ 4·4803 = francs 25,22·15 centimes.—Ans.

II. The British monetary sign for a franc? The sum is—

4·4803 ÷ 113·0016 = ·03964 of £ × 240 = 9·515 pence.—Ans.

There is another method of reaching the same answer.

III. The British monetary sign for one grain of gold is 2·123863 pence. The weight of pure gold in the franc multiplied by this will give the British monetary sign for one franc. The sum is—

4·4803 × 2·123863 = 9·52 pence.—Ans.

Another method of obtaining a closely approximate answer.

IV. The weight of pure gold indicated by one penny is ·4708 of a grain: the franc is 4·4804 grains of pure gold. The sum is—

4·4804 ÷ ·4708 = 9·516 pence.—Ans.

V. Take silver. The Shanghai tael weight has as its equivalent 516·4058 grains of pure silver. The mint issue weight of the Mexican dollar or peso is 377·1809 grains of

pure silver. What is the Mexican monetary sign for one tael? The sum is—

516·4058 ÷ 377·1809 = 1·37c. dollar or peso.—Ans.

VI. The China monetary sign for a dollar? The sum is—

377·1809 ÷ 516·4058 = 730 cash.—Ans.

These fixed pars between the 17 gold systems and between 12 chief silver coins will be found on pages 74-80. These fixed pars in a chain rule sum are worked on mint issue weights of pure metal, gold or silver. The fixed par of exchange between the British Isles and France is 9·515 pence, and the link in the chain would thus appear—

grains of gold 113·0016 *v.* 4·4804 grains of gold

The link in the chain if equivalent monetary signs were worked with would be—

franc 1 = 9·515 pence

The same principles apply to fixed silver pars of exchange.

Absolute Metal Pars of Exchange.—These are based upon the almost daily varying gold price of silver in gold standard countries, and similar variations in the silver price of gold in silver standard countries. The daily ratio between gold and silver is one of the most important items of information that could be given to the commercial and financial world. It can be ascertained from the commercial news furnished now by most daily papers through taking the market quotation for an ounce of silver and dividing the constant 942·9955 by it.

The London price of bar silver to-day, the 21st of September, 1898, is 28 and $\frac{5}{16}$ pence per ounce, and it is desired to know what ratio of silver to 1 of gold is indicated by the quotation. The sum is—

942·9955 ÷ 28·3125 = 33·31 parts of silver to 1 part of gold.—Ans.

An absolute metal par of exchange is indicated by two different monetary signs, one for pure gold, the other for pure silver at the varying gold price of silver and silver price of gold of the day. As, at the ratio of 34·44 parts of silver to 1 part of gold, the absolute par of the day between the British Isles and Mexico is 23¼ pence for 1 peso. 3·28 pence

is the British sign for 1 decigram of pure gold. The sum is—

Peso 244·41 decigrams ÷ 34·44 × 3·28 pence = 23·27816 pence.

A constant for use in determining the ratio resulting from a given price is attached to each monetary system in Table III. presented herewith.

Absolute Currency Pars of the Day depend upon (I.) the variable ratio between gold and silver. (II.) The variable increased purchasing power conferred by legislation on a definite weight of silver, such as exists in the British Indian currency exchange intermediary at the present time, the 165 grains of silver in the rupee doing the work of 248 grains of silver. (III.) The variable paper premium on gold. (IV.) The variable paper premium on silver.

To obtain the absolute par between a gold and a silver intermediary, three links are introduced into a chain rule sum. To find the absolute par of exchange between the British Isles and Mexico, the mint issue weight of the pound and the mint issue weight of the peso, together with the ratio of the day between gold and silver, determine it.

State the mode of reaching the absolute par of exchange between the British Isles and Mexico, the ratio being 33·31 parts of silver to 1 part of gold, the links are—

peso 1 = 377·181 grains of silver
grains of silver 33·31 = 1 grain of gold
grains of gold 5·65 = 1 shilling

VII. What is the absolute par of exchange of the day, weight for weight, in the British Isles with Mexico, the ratio of silver to 1 of gold being 33·31? The Mexican peso or dollar at mint issue weight is 377·1809 grains of pure silver; the British shilling is a token for the 20th part of a pound, and therefore does the work of 5·65 grains of gold. The sum is—

? (shillings) = 1 dollar
dollar 1 = 377·1809 grains of silver
ratio of silver to 1 of gold 33·31 = 1 of gold
grains of gold 5·65 = 1 shilling

$$\frac{1 \times 377{\cdot}1809 \times 1 \times 1}{1 \times 33{\cdot}31 \times 5{\cdot}65} = 2{\cdot}004 \text{ shillings.—Ans.}$$

24 and $\frac{3}{64}$th pence is the absolute par between the British Isles and Mexico for the peso at 33·31 parts of silver to 1 part of gold. The Mexican coinage charge is 2 per cent. The equivalent exchange to the cost of the silver with shipping and all charges including the 2 per cent. coinage charge and loss of interest for the time between the purchase of silver in the British Isles and the possession of the peso in Mexico, say 3 and ½ per cent., would bring it up to 24·004 pence + 3½ per cent. = 24·84 pence, or 24 and $\frac{29}{32}$ pence. In 1873 the ratio of silver to gold was not half of what it is now, and in consequence the British price of the peso was 54 pence.

VIII. What is the absolute par of exchange of the day, weight for weight, between a Shanghae tael and a dollar of the United States of North America, at a ratio of 33·31 of silver to 1 of gold, the tael 516·4058 grains of pure silver, and the dollar 23·22 troy grains of pure gold?

? (tael) = 1 U.S.A. gold dollar
dollar 1 = 23·22 grains of pure gold
grain 1 = 33·31 of silver
grains of silver 516·4058 = 1 tael

$$\frac{1 \times 23 \times 33{\cdot}31 \times 1}{1 \times 1 \times 516{\cdot}4058} = \frac{11{\cdot}61}{208{\cdot}2029} = \text{tael } 1{\cdot}394.\text{—Ans.}$$

PREMIUM AND DISCOUNT ON PARS OF EXCHANGE.

The recognized scientific manner of working the exchanges between two countries in which the standard substance forming the chief money of account does not correspond in quality and weight is by adding the premium to, or deducting the discount from, fixed and absolute pars; the premium or discount to be taken upon the currency of the country in which the exchange transaction is originated. We shall see on page 31 that this is not the world's present custom. It is thus between effective gold standard countries, such as between the British Isles and Australasia, France, and Belgium. He who in London desires to make a remittance to Australia would rather pay a little more for a good bill at sight than the cost of the shipment of sovereigns.

He who in London wishes to receive money from Australia would rather take a little less than the cost of bringing sovereigns from Australia. The first operator pays a premium on par for the bill that he buys. The second operator sells his bill at a discount. These are actual percentage premium and discount operations. All other bill operations partake of the same nature under the terms "Rates of Exchange."

THE CONVERSION OF ONE CURRENCY INTO ANOTHER.

To convert one currency into another, the first factor in the rate of exchange must be the currency of the country operating to find the equivalent in the country operated upon.

Take the exchange between the British Isles and France, and find the equivalent in London for a French franc; weight for weight. The mint issue weight of pure gold in the sovereign is 73·224 decigrams, in the franc 2·903 decigrams.

The sum is—

$$2{\cdot}903 \div 73{\cdot}224 \times 240 = 9{\cdot}516 \text{ pence.—Ans.}$$

To convert £1000 into francs at this exchange.

The sum is—

$$1000 \times 240 \text{ pence} \div 9{\cdot}516 = 25{,}220 \text{ francs } 66 \text{ centimes.—Ans.}$$

To find the equivalent in Paris for a sovereign, weight for weight, the pure gold in the mint issue of one franc being 2·903 decigrams, and in the sovereign 73·224 decigrams; the weight of gold in the sovereign must be divided by the weight of gold in the franc.

The sum is—

$$73{\cdot}224 \div 2{\cdot}903 = 25 \text{ francs } 22{\cdot}3 \text{ centimes.—Ans.}$$

To convert 100,000 francs into sovereigns.

The sum is—

$$100{,}000 \div 25{\cdot}223 = £3964{\cdot}59\text{.—Ans.}$$

It will be noticed in the above sums that the decimal places are too few to arrive at absolutely correct answers.

In presenting foreign currency for exchange in a country, the first factor in the rate of exchange should invariably be the currency of the country in which the exchange is to be made.

Assume that fifty sovereigns or credit instruments of equal value are presented for exchange in France, and the money-changer offers at the rate of 10 pence for a franc.

The sum would be—

$50 \times 240 \text{ pence} \div 10 = 1200$ francs, or 24 francs for one sovereign.

The par rate between France and the British Isles is 25·22 francs, and is, therefore, 5 per cent. more than 24 francs for one sovereign. This percentage charge is out of all proportion to what it ought to be between automatic gold monetary systems whatever distance separates the two. Twenty-four francs for a British pound would indicate the possession of a gold-cum-counter-charge currency system in France.

By referring to the *Times* quotation of Exchange on London at dates, the rates in 17 countries are given; 8 of these rates are scientific, being variable rates in the currency of the country for the pound sterling, and 9 are unscientific, being the whole money of account of each for variable pence in London. There are only two countries between which the scientific rule is practised in both, viz. the British Isles and Russia. In the British Isles it is fluctuating pence for a rouble, and in Russia it is fluctuating roubles for a pound. Between the 8 countries first alluded to, the rate in London is literally a pound for the variable currency of these countries. If the scientific principle was followed throughout the world, the uninitiated would not be so puzzled as they are at present over the exchanges. It is clearly seen that were this principle followed, a rise in the rate of exchange in the country thus acting would indicate a fall in the country with which the exchange is made, and *vice versâ* in the case of a fall in the rate. We can see this by looking at the exchange with Russia. The exchange in Russia is, say, 9 roubles 46 copecks for a pound, and it is 25·37 pence per rouble in London, 25·37 pence per rouble is the same rate as 9 roubles 46 copecks per pound.

The sum is—

$240 \div 25{\cdot}37 = 9$ roubles 46 copecks.—Ans.

Take the price of the rouble at 26 pence, which is a rise of 2·44 per cent. on 25·37 pence. Ascertain the roubles thus given for a pound.

The sum is—

$$240 \div 26 = 9 \text{ roubles } 23 \text{ copecks.—Ans.}$$

We see that a higher rate in London gives an equivalent lower rate in Russia, and that a higher rate in Russia gives an equivalent lower rate in London.

Operators in the exchange for profit find it more convenient to follow the unscientific method.

N.B.—Travellers should be careful to get their quotations for foreign currency in the variable factor of the currency of the country they are in, and to put themselves into the position of acquainting the money-changer with the par worth of the currency they offer for exchange. Never allow the use of the first factor in the quotation as a divisor. It should always be a multiplier in the currency of the country the stranger is in. As an example. A sailor having to exchange a shilling in France should get the quotation in francs and centimes. The French par with one shilling is f. 1·26. The British par with one franc is 9 and ½ pence. Ten pence sounds a good rate, but as a divisor of 12 pence it only gives f. 1·20, nearly 4·8 per cent. less than f. 1·26.

One of the first questions which a traveller and a trader would ask about a country is, What is its currency? For if I am going to travel or do business in another country I shall have to change my money for that of the country I am about to visit or trade with. What time must elapse before the intending traveller or trader, by resorting to some place provided by the Government of his country, could make himself acquainted by sight and touch with the metal money, and tokens of it, that he would meet with in his travel or trade?

This pamphlet comprises all the guidance necessary for the comprehension and working of the exchanges by sailors, soldiers, and travellers. For large transactions more decimal places would be requisite.

PROBLEMS TO BE SOLVED BY THE USE OF THE UNIT OF WEIGHT, AND THE WORLD'S MONETARY SIGNS FOR ITS CHIEF MONEYS OF ACCOUNT. EFFECTIVE GOLD.

1. What weight of pure gold in grains is indicated by £4 7*s*. 5*d*. ?

2. What weight of pure gold in grams is indicated by £20 17*s*. 8*d*. ? A decigram is the tenth of a gram.

3. Put the United States monetary sign upon the weight of gold indicated by £30 8*s*. 10*d*.

4. What is the Russian monetary sign for 8,756 decigrams of gold ?

Exchange the French sign 25 centimes into signs indicating the same weight of pure gold in the following countries :—

5. In Egypt. 6. In British Isles. 7. In Turkey. 8. In Portugal. 9. In Uruguay. 10. In the United States. 11. In the Argentine Republic. 12. In Brazil. 13. In Russia. 14. In Japan. 15. In Holland. 16. In Chili. 17. In Denmark. 18. In Germany. 19. In Austria-Hungary.

N.B.—Use decigram to the fourth decimal. Refer to Table III. Show the weights in all answers.

The answers to these sums show what the rates of exchange would be for bills at sight or cheques if each system was a scientific automatic one, but some of them consist of inconvertible paper based on gold, and would present from slight to heavy percentage differences.

BASAL GOLD OR INCONVERTIBLE PAPER BASED ON GOLD.

Gold is at 600 per cent. premium in the Republic of Paraguay. The Paraguay gold money is the same as that of the Argentine Republic. It is a peso of 14·516 decigrams of pure gold on issue from the mint. What is the British par value of the paper peso ?

The sum is—

pence ? = 1 paper peso
gold peso 1 = 14·516 decigrams of gold
decigram of gold ·305 = 1 penny
600 per cent. premium 700 = 100.

$$\frac{1 \times 14{\cdot}516 \times 1 \times \overset{1}{\not{1}\not{0}\not{0}}}{1 \times {\cdot}305 \times \underset{7}{7\not{0}\not{0}}} = 6{\cdot}8 \text{ pence: Ans.}$$

Prove this: Under fixed gold pars No. 2, against Argentine peso 47·578 pence is found at page 75. 600 per cent. premium is equal to 85·71 per cent. discount.

47·578 — 85·71 % dis. = 6·8 pence: Ans.

To discover the paper pésos to the pound—

240 pence ÷ 6·8 pence = 35·29 pesos: Ans.

Take the *Times* quotations, or those of any other daily paper, and these differences are immediately perceived. The weight of pure gold for the British pound in the chief moneys of account of Paris, Brussels, Italy, and Madrid, is the same, but the quotations vary greatly. Paris 25 francs 19 centimes to Madrid 32 pesetas 70 centimos, a difference of about 30 per cent., showing that gold is at 30 per cent. premium in the currency of the country which consist of inconvertible paper based on gold. This premium in paper upon gold denotes about 23 per cent. discount on gold for the inconvertible paper currency.

The rate in Italy is 27 lire 14 centesimi. This is 7 per cent. more than the French rate, and indicates that the currency of Italy consists of inconvertible paper based on gold.

At Madrid the quotation is 32 pesetas 70 centesimos. The par rate is 25·22 pesetas. This shows a premium of 29·66 per cent., and indicates that the currency is basal gold.

At Lisbon the sight quotation is 36·25 pence on London. The gold par is 53·278 pence. This compared with 36·25 pence shows that gold is at a premium of 47 per cent. in the inconvertible paper based on gold currency of Portugal. This premium is equal to 32 per cent. discount on gold for the inconvertible paper currency at present in use.

At Rio de Janeiro the quotation is 7·5 pence. The British par value of the Brazilian milrei is 27 pence. This compared with 7 and ½ pence shows that gold is at a premium of 274 per

cent. in inconvertible paper based on gold. This premium is equivalent to 72 per cent. discount on gold for the present currency of the country.

Under Buenos Ayres 22·78 pence, and gold premium 109 per cent. are given. The British equivalent to Argentine gold is expressed by 47·578 pence. This, compared with 22·78 pence, shows that gold is at 109 per cent. premium, which is equivalent to 52 per cent. discount on gold for the present currency of the Argentine Republic.

Against Valparaiso 90 days sight is 10·5 pence. Assume that the demand rate would be 11·5 pence. The British par with the Chilian gold condor is 18 pence. This, compared with 11·5 pence, shows that gold is at a premium of 56 per cent., or equivalent to a discount on gold of 36 per cent. for the present currency of the country.

For practice in the use of the unit of weight system all the above sums should be worked in weights of pure gold.

20. Prove that the British monetary sign for 2·903 decigrams of pure gold, which is the mint issue weight of one franc, is 9½ pence.

21. Demonstrate the weight of pure gold, in grains, indicated by 9·515 pence.

Notice that the weight of pure gold indicated by a franc or 100 centimes is also indicated by the following signs:— Bulgaria, leva or 100 stotinki; Finland, mark or 100 pennia; Greece, drachma or 100 lepta; Italy, lira or 100 centesimi; Roumania, leu or 100 bani; Servia, dinar or 100 paras; Spain, peseta or 100 centesimos; Belgium and Switzerland, franc or 100 centimes. The dollar, peso, sol, sucre of some of the Central and South American republics are generally said to be equivalent to four shillings. Where the weights of these are five times that of the franc, as under the Argentine Republic, Paraguay, and some others, that is, 22·4018 grains, or 14·5161 decigrams of pure gold at 15½ parts of silver to 1 of gold, or five times the weight of the silver franc, that is, as under Columbia, 347·2278 grains, or 225·0000 decigrams of pure silver, it is not correctly stated at four shillings.

22. Prove that the gold chief money of account of these republics is only worth five times the franc, or 47·575 pence, and that the silver coin at the ratio of 15½ parts of silver to 1 part of gold is only equal to 47·575 pence.

EFFECTIVE SILVER.

23. What weight in decigrams of pure silver does 76 Mexican pesos indicate?

24. Put the Shanghai tael monetary sign upon 76,352 decigrams of silver.

25. How many decigrams of pure silver are indicated by 8796 Columbian sols?

26. Put the Mexican monetary sign upon the weight of silver indicated by 876 ticals.

27. Exchange the Mexican sign 13 centavos into signs indicating the same weight of pure silver in the following countries: China, Shanghai, Java, Philippines, Columbia, Bolivia, Siam, Persia.

The weight of pure silver on issue from the mints in the silver standard chief moneys of America are:—

Mexican peso	244·4092	decigrams ..	377·1810	grains.
Columbian sol	225·000	„ ..	347·2278	„
Bolivian boliviano ..	202·500	„ ..	312·5050	„

The greatest weight of these is 20·7 per cent. more than the least. The weight of the Columbian sol is still the legal tender token in many of the republics which have declared for a gold standard. The currency among them, with two or three exceptions, is inconvertible paper. There are not now in the whole of the Americas more than two or three republics that have, or profess to aim at having, a silver standard.

The following are the mint issue weights of pure silver in coins of the dollar class circulating in the East:—

Trade dollar	244·9400	decigrams ..	378·0000	grains.
Mexican peso	244·4091	„ ..	377·1810	„
Japan yen .. .. } British dollar .. .. }	242·6076	„ ..	374·4000	„
Java dollar, or 2½ guilders	236·2500	„ ..	364·5925	„
Philippine dollar ..	233·6400	„ ..	360·5628	„

The British value to-day of the heaviest of the above at 34 parts of silver to 1 part of gold is 23·62 pence, and the lightest 22·38 pence. The difference is 5·5 per cent. on the lightest.

The mint issue weight of pure silver in the U.S. dollar is 240·567 decigrams, or 371·2514 grains. In the British Indian rupee it is 106·9205 decigrams, or 165 grains.

Among the occasional quotations of the "Exchange on London at dates" in the *Times*, of the sixteen from different countries two are from effective silver standard countries and one from a silver-cum-counter-charge country.

Shanghai T.T. 2*s*. 8$\frac{3}{4}$*d*.—The meaning of this is that for one Shanghai tael a telegraph transfer for 32·75 pence payable in London will be granted in Shanghai.

28. Demonstrate the weight of silver indicated for the weight of gold in decigrams with the ratio between the metals.

Hongkong sight, 1*s*. 11$\frac{1}{4}$*d*.—The meaning of this is that for a Mexican dollar or peso a bill at sight for 23·25 pence on London can be obtained in Hongkong.

29. Demonstrate the weight of silver indicated for the weight of gold in decigrams, also the ratio between the metals.

SILVER-CUM-COUNTER-CHARGE CURRENCY.

Bombay T.T. 1*s*. 4$\frac{1}{8}$*d*.—The meaning of this is that for one rupee a telegraph transfer for 16·125 pence payable in London will be granted in Bombay for one rupee there.

30. Demonstrate the weight of silver indicated for the weight of gold in decigrams, also the ratio between the metals. To answer this question the silver rupee in Table IV. must be used.

31. Demonstrate, by the use of the gold rupee aimed at, the weight of gold in Bombay for the weight of gold in London indicated by the quotation. (See Table III.)

32. Demonstrate the percentage amount by which India's exports are handicapped at the present time by effective silver standard countries through the use of this silver-cum-counter-charge currency, or the effective gold currency, should the same be procured and maintained.

BASAL SILVER, OR INCONVERTIBLE PAPER BASED ON SILVER.

In the United States of Columbia exchange is quoted at 100 per cent. It may be on gold, but I do not know that it is the case. Assume that this is the premium on silver. What is the weight of gold in decigrams, and the British monetary sign for it, in exchange for a Columbian peso, at 34 parts of silver to 1 part of gold?

Example by the chain rule.—The factors to be worked are: the mint issue weight of the sol, Table I., 225 decigrams; the ratio between the metals 34; the British monetary sign for a decigram, 3·28 pence; and the percentage premium in inconvertible paper for silver 100 per cent.

The sum is—

pence = 225 decigrams of silver
parts of silver 34 = 1 part of gold
decigram of gold 1 = 3·28 pence
100 per cent. pm. 200 = 100.

$$\frac{225 \times 1 \times \overset{1{\cdot}64}{\cancel{34}} \times \cancel{328} \times \cancel{200}}{\underset{17}{\cancel{34}} \times \cancel{1} \times \underset{2}{\cancel{200}}} = 10{\cdot}85 \text{ pence: Ans.}$$

Prove this. One hundred per cent. premium is equivalent to 50 per cent. discount. Find the equivalent in gold to 225 decigrams of silver at 34 of gold to 1 of silver; deduct 50 per cent. from the result and convert the weight into pence.

The sum is—

$$225 \div 34 - 50 \text{ per cent.} \times 3{\cdot}28 = 10{\cdot}85 \text{ pence: Ans.}$$

This is an example which will serve also for inconvertible paper based on gold, one factor, the ratio, being omitted.

POSTAGE STAMPS.

It is a simple and interesting investigation to determine which of the five diverse intermediaries, viz. automatic gold, automatic silver, silver-cum-counter-charge, inconvertible paper based on gold, inconvertible paper based on silver, is in use on the seaboard of each international trading community. The means is by the study of postage stamps.

There is an international postal arrangement whereby for the conveyance and delivery of a letter of the weight of half an ounce avoirdupois, or its equivalent in other countries' weights, between certain countries, a charge of 25 centimes is made, or the equivalent to 25 centimes in the currencies of other countries.

The Governments of all countries have appointed a definite weight of pure gold or of pure silver as their chief money of account and equivalent in exchange. If each country of the world possessed an effective gold standard, the charge for the half-ounce letter would be the same weight of gold, but under a different monetary sign. The same thing would happen if each country had an effective silver standard. With diverse monetary signs it is impossible in working to make the gold or silver weight-charge exactly the same for each country. By the abolition of signs and the use of weight only this could be done. But at present the world's prices are effective gold here, effective silver there, silver with a counter-charge in a third group of places, inconvertible paper based on gold in a fourth group of places, and inconvertible paper based on silver in a fifth group of places.

The Universal Postal Union embraces more than 100 countries and islands. The postages equivalent to 25 centimes are represented in twenty-seven different rates. There are fifty-four quotations attached to the 100 countries of the Union. The cents of a dollar and the centavos of a peso embrace eighteen quotations.

Columns III. in Tables I. and II. are thus constructed. The weight of pure gold indicated by 25 centimes must be found. The mint issue weight of pure gold in the franc being 2·90322 decigrams and 25 centimes being the monetary sign for the quarter of a franc, the weight sought after is ·7258 of a decigram.

$$2{\cdot}90322 \div 4 = {\cdot}7258 \text{ of a decigram.}$$

The multiplication of this weight by the monetary sign for one decigram of metal against each monetary system in Col. V. of Table III. should give the figures in Col. III. of Tables I. and II.

TABLE I.

Col I. Name of country and standard; g. for gold, s. for silver, m. possessor of a mint, i.p. inconvertible paper. II. Rate of Universal Postal Union. III. The equivalent to 25 centimes at $15\frac{1}{2}$ parts of silver to 1 part of gold. IV. The gold equivalent to the silver at 34 parts of silver to 1 part of gold or $54\frac{2}{5}$ per cent. discount upon gold.

GOLD.

Col. I.	Col. II.	Col. III.	Col. IV.
I. Egyptian, g.	1 piastre	·98 p	·44 p
II. British, g. m.	2·5 pence	2·38 p	1·09 p
III. Turkish, g. m.	40 paras	43·89 p	20·01 p
IV. Portuguese, i.p.g. m.	50 reis	44·64 r	20·36 r
V. Uruguayan, i.p.g.	5 centavos	4·66 c	2·13 c
VI. United States, g. m.	5 cents	4·82 c	2·20 c
VII. Argentine, i.p.g. m.	8 centavos	5·00 c	2·28 c
VIII. Brazilian, i.p.g. m.	200 reis	88·32 r	40·27 r
IX. Russian (new), g. m.	10 kopecks	9·38 k	4·28 k
„ (old) „			
X. Japanese (new), g. m.	10 sens	9·67 s	4·41 s
„ (old) „			
XI. Dutch, g. m.	12·5 cents	12·00 c	5·47 c
XII. Chilian (new), i.p.g. m.			
„ (old) „	5 centavos	5·28 c	2·41 c
XIII. British Indian (new)	2·5 annas	2·38 a	1·09 a
XIV. Scandinavian, g. m.	20 ores	18·00 o	8·21 o
XV. German, g. m.	20 pfennigs	20·25 pf	9·24 pf
XVI. Austria-Hungarian (new), g. m.			
„ (old) „	10 kreutzers	10·00 k	4·56 k
XVII. French, g. m.	25 centimes	25·00 c	11·40 c

TABLE II.

Col. I. Name of country. II. Rate of Universal Postal Union. III. The equivalent to 25 centimes at $15\frac{1}{2}$ parts of silver to 1 part of gold. IV. The silver equivalent to gold at $119\frac{3}{10}$ per cent. premium.

SILVER.

Col. I.	Col. II.	Col. III.	Col. IV.
XVIII. Shanghai, s. m.		33·64 c	73·76 c
XIX. Mexico, s. m.	5 centavos	4·61 c	10·09 c
XX. Japan	5 sens	4·63 s	10·14 s
XXI. Java, s.	12·5 cents	4·72 c	10·35 c
XXII. Philippines, s. m.	5 centavos	4·84 c	10·61 c
XXIII. Columbia, i.p.s.	5 centavos	4·95 c	10·85 c
XXIV. Bolivia, s. m.	10 centavos	5·51 c	12·08 c
XXV. Russia	10 kopecks	6·19 k	13·57 k
XXVI. Siam, s. m.	10 atts	4·95 a	10·85 a
XXVII. Austria-Hungary	10 kreutzers	10·12 k	22·19 k
XXVIII. British India, silver rupee	2·5 annas	20·25 pies	44·40 pies
XXIX. Persia, s. m.	12 shahis	5·40 s	11·84 s
XXX. Corea, s. m.	25 poons or cash	23·73 p	52·04 p

An att is the 64th part of a tical. In the Kingdom of Corea the chief coin coined there is a large silver coin of 5 riangs, or 500 cash. The mint issue weight of pure silver is 374·4 grains; so it is of the same value as the Japanese silver yen, which is divided into 100 sen; therefore 5 Corean cash make 1 sen and 20 sens make 1 riang. A cash and a poon appear to denote the same weight of silver. Thirty-two Portuguese reis equal 1 tanga, a coin used in the East; 2 tangas, or 64 reis, indicate 1·0406 decigram of pure gold. Accounts in Newfoundland are kept in the gold dollar of the country, which is 15·25497 decigrams of pure gold on issue from the mint. One cent and a halfpenny indicate the same weight of pure gold. This dollar is no longer coined.

The currency of each country should be known. In the tables presented herewith, attached to each country there are letters to denote the currency, &c. Currency: g. Effective gold; s. effective silver; s.c. silver-cum-counter-charge; i.p.g. inconvertible paper on gold; i.p.s. inconvertible paper on silver. The possession of a mint will be indicated by m.

THE HALF-OUNCE LETTER RATES IN THE UNIVERSAL POSTAL UNION.

Tables I. and II. present 31 different rates in the Universal Postal Union for the carriage of half an ounce letter over-sea. Col. III. The monetary sign for the weight of pure gold indicated by 25 French centimes at 15 and ½ parts of silver to 1 part of gold. Col. IV. under gold. The monetary sign for the weight of gold equivalent to 1 part of gold to 34 parts of silver. And under silver, the monetary signs for the weight of silver equivalent to gold at 34 parts of silver to 1 part of gold. The sums in these two tables would by practice appear very simple to ordinary arithmeticians. They should be worked by the decigram. (See Table No. III.)

EXERCISES ON TABLE I.

Of the 17 gold rates in Table I., 11 rates are for effective gold currencies, and 6 for inconvertible paper based on gold currencies. By comparing the rates in Col. III. with those in Col. II., it will be seen that not one of them conforms with the 25 centime rate.

The following are sums upon six basal gold rates:—

33. Here is a Portuguese postage stamp for 65 reis. What paper premium on gold does this sum represent?

34. Here is an Uruguay stamp of 10 centesimos. What weight of gold and paper premium on gold does this represent?

35. Here is an Argentine postage stamp for 10 centavos. What weight of gold and paper premium on gold does this represent?

36. Here is a Peruvian postage stamp for, say, 12 centavos.

What weight of gold and paper premium on gold does this represent?

37. Here is a Brazilian stamp for 200 reis. What weight of gold and paper premium on gold does this represent?

38. Here is a Chilian stamp for 10 centavos. What weight of gold and paper premium on gold does this represent?

The answers to these questions compared with the Postal Union rates will determine the nature of the currency.

EXERCISES ON TABLE II.

34 PARTS OF SILVER TO 1 PART OF GOLD.

39. Here is a Mexican stamp for 10 centavos. What weight of pure silver does it indicate? What is the percentage increase in weight over that indicated by 4·603 centavos? What is the gold equivalent?

40. Here is a Bolivian stamp for 10 centesimos. What weight of pure silver does it indicate? What is the percentage increase in weight over that indicated by 5·55 centesimos? What is the gold equivalent?

41. Here is a Siamese stamp for 10 atts. What weight of pure silver does it indicate? What is the percentage increase over the weight indicated by 4·1 atts? What is the gold equivalent?

42. Here is a Persian stamp for 12 shahis. What weight does it indicate? What is the percentage increase of weight over that indicated by 5·43 shahis? What is the gold equivalent?

43. Here is a Corean stamp for 25 poons. What weight does this indicate? What is the percentage increase over that indicated by 24·73 poons? What is the gold equivalent?

These rates are effective silver. The variation results from the change of rates from 15½ to 1 to 34 to 1 between silver and gold.

Here is a British India stamp for 2½ annas. At present there is no standard in British India, and there cannot be an

effective gold standard until legal tender State notes are converted into gold at the will of the holder of them without question, delay, or expense. If the British Indian Government possessed and exchanged gold rupees for their notes, fifteen of these rupees would indicate the weight of pure gold in the British pound. 2 and ½ annas would indicate the weight of gold which 2 and ½ pence does. At present, since State notes are convertible into silver rupees only, of 165 grains of pure silver each, the British value of a rupee at 34 to 1 is 10·31 pence. The fictitious rupee now commands 16 pence. This shows that the present British Indian intermediary is a silver-cum-counter-charge one, having a fictitious value of 55 per cent. more than its world-wide market worth.

Any experienced teacher of youth could interest an appreciative mind with a vast diversity of questions having as their basis the diverse currencies of the world at present in use.

In 1887 I was privileged to address a meeting under the auspices of the London Institute of Bankers at the London Institution upon the metallic bases of the colonial and foreign exchanges and the simplification of exchange. The chairman of the meeting was at that time a well-known successful manager of an Eastern Exchange Bank. In the course of his remarks at the close of the lecture he said, "As regards the question of the knowledge of the young men of this country with respect to exchanges, I think that those among us who have been accustomed to visit foreign lands, and have conversed with merchants on the Continent, must acknowledge that the business men of France and Germany are far better trained in this special branch than we are. I would impress upon all those present this evening the great advantage of being able to calculate by the chain rule; a man accustomed to that branch of arithmetical calculation can quickly work out intricate problems, not only in exchanges, but also where the sale and purchase of produce is concerned."

Some years ago now it was confidently asserted that within ten years of the commencement of the teaching of the subject in the simple manner it can be taught in the schools of the world, the utmost astonishment would be expressed at the

ignorance in which the human mind is now sunk upon the subject of money and the mechanism of the interchanges of things between man and man, and community and community.

It is with the view to open out truth upon these most important subjects, more than has been done in my "Universal Cambist," that this pamphlet has been written. It appeared in the same year, 1898, as Messrs. C. Pendlebury and W. S. Beard produced their book upon Commercial Arithmetic. Eighteen pages of this book are given to examples and questions upon monetary systems and exchange. On page 127 will be found—

"146. The following is a more complicated example of a kind which is often met with in business transactions.

Example. Express 15 francs per kilogramme in pence per lb., assuming that francs 25·1 = £1, and 1 kilog. = 2·2 lb.—

$$\begin{aligned}
\text{The cost of 1 kilog.} &= 15 \text{ francs} \\
\therefore\ 2{\cdot}2 \text{ lb.} &= 15 \text{ francs} \\
\therefore\ 2{\cdot}2 \text{ lb.} &= \frac{15 \times 240}{25{\cdot}1} \text{ pence} \\
\therefore\ \quad 1 \text{ lb.} &= \frac{15 \times 240}{25{\cdot}1 \times 2{\cdot}2} \text{ pence} \\
&= \frac{1{,}800}{27{\cdot}61} \text{ pence} \\
&= 65 \text{ pence nearly} \\
&= 5s.\ 5d."
\end{aligned}$$

By the chain rule. The statement and sum are—

$$\begin{aligned}
\text{? (pence)} &= 1 \text{ lb.} \\
\text{lb. } 2{\cdot}2 &= 1 \text{ kilog.} \\
\text{kilog. } 1 &= 15 \text{ francs} \\
\text{francs } 25{\cdot}1 &= 240 \text{ pence}
\end{aligned}$$

$$\frac{1 \times 1 \times \overset{3}{\cancel{15}} \times \overset{120}{\cancel{240}}}{\underset{1{\cdot}1}{\cancel{2{\cdot}2}} \times 1 \times \underset{5{\cdot}02}{\cancel{25{\cdot}1}}} = 65{\cdot}1938 \text{ pence being } {\cdot}0063 \text{ more than } 65\tfrac{3}{16} \text{ pence.—[Ans.}$$

On page 206 there is another example—

"Example i. If the exchange between London and Amsterdam be 36 shillings Flemish per £ and between Paris and Amsterdam 2 fr. per 3*s*. Flemish, how much must be remitted to Paris by way of Amsterdam to pay a debt of 20,000 fr.? Find also the rate of exchange between London and Paris.

We have—

$$\begin{aligned}
1 \text{ franc} &= \tfrac{3}{2}s. \text{ Flemish} \\
1s. \text{ Flemish} &= \tfrac{1}{36} \text{ £ sterling} \\
\therefore 20{,}000 \text{ francs} &= 20{,}000 \times \tfrac{3}{2}s. \text{ Flemish} \\
&= 20{,}000 \times \tfrac{3}{2} \times \tfrac{1}{36} \text{ £} \\
&= \text{£}\tfrac{2500}{3} \\
&= \text{£}833\ 6s.\ 8d. \\
\therefore \text{ sums sent to Amsterdam} &= \text{£}833\ 6s.\ 8d.
\end{aligned}$$

Again—

$$\begin{aligned}
\text{£}1 \text{ sterling} &= 36 \text{ Flemish} \\
&= 36 \times \tfrac{2}{3} \text{ francs} \\
&= 24 \text{ francs}
\end{aligned}$$

$\therefore$ rate of exchange between London and Paris is given by £1 sterling = 24 francs."

By the chain rule. The statements and sums are—

(1) ? (pounds) = 20,000 francs
francs 2 = 3 shillings
shillings 36 = £1

$$\frac{10{,}000 \quad 1}{\cancel{2}\cancel{0},\cancel{0}\cancel{0}\cancel{0} \times \cancel{3} \times 1} = \text{£}833{\cdot}333 \text{ or } \text{£}833\ 6s.\ 8d.\text{—Ans.}$$
$$\cancel{2} \times \cancel{3}\cancel{6}$$
$$1 \quad 12$$

(2) ? (francs) = £1
£1 = 36 shillings
shillings 3 = 2 francs

$$\frac{12}{1 \times \cancel{3}\cancel{6} \times 2} = 24 \text{ francs.—Ans.}$$
$$1 \times \cancel{3}$$
$$1$$

I observe with great satisfaction that among weights, &c., at the beginning of the book a page is given to the mint issue weights of pure metal in grains for fourteen chief gold standard moneys of account, and for eight chief silver coins. It would not be too much for children to learn these to the second decimal point. I do hope that the chain rule will be the vehicle for instruction upon money for the traveller, the merchant, and the financier.

The bases of my "Universal Cambist" are presented in the accompanying 19 tables. I believe the simplest and clearest method of working all problems connected with money upon my system, is by the chain rule. If this is generally acquiesced in, this little pamphlet presents a progression upon my previous teaching which I earnestly hope may hasten the time when all youths leaving the school for the world will have imbibed all

the instruction useful to them which my writings are intended to impart.

Table III. gives the mint issue weights in decigrams of pure gold in 17 chief gold moneys of account, and the weights of gold indicated by portions of each money of account: 17 monetary signs for 1 decigram of pure gold, and 17 constants attached by which to determine the daily ratio between gold and silver; and the same for the 13 silver monetary systems.

Table IV. gives the mint issue weights in grains of pure gold in 17 chief gold moneys of account, and the weights of gold indicated by portions of each money of account: 17 monetary signs for 1 grain of pure gold, and 17 constants attached by which to determine the daily ratio between gold and silver; and the same for the 13 silver monetary systems.

TABLE V.

Fixed Gold Pars.

Col. I. Name of country and chief money of account. Col. II. Each country's monetary sign for the weight of pure gold in the sovereign at mint issue weight. Col. III. British monetary sign for each chief gold money of account.

Col. I.	Col. II.	Col. III.
I. Egypt, pound ..	98·45 piastres	243·773 pence = £1 0*s.* 3$\frac{3}{4}$*d.*
II. Turkey „ ..	112·44 „	216·804 „ = 18*s.* 0$\frac{13}{16}$*d.*
III. Portugal, milrei ..	4·57 milreis	53·278 „
IV. Uruguay, peso ..	4·78 pesos	51·005 „
V. U.S.A., dollar ..	4·866 dollars	49·315 „
VI. Argentine, peso ..	5·123 pesos	47·578 „
VII. Brazil, milrei ..	8·91 milreis	26·935 „
VIII. Russia, rouble ..	9·46 roubles	25·373 „
IX. Japan, yen ..	9·76 yens	24·582 „
X. Holland, guilder..	12·11 guilders	19·823 „
XI. Chili, condor ..	13·33 condors	17·997 „
XII. Brit. India, rupee	15· rupees	16· „
XIII. Scandinavia, crown	18·16 crowns	13·216 „
XIV. Germany, mark ..	20·43 marks	11·747 „
XV. Austria, crown ..	24·02 crowns	9·992 „
XVI. France, franc ..	25·22 francs	9·515 „

In presenting fixed silver pars of exchange as they existed before 1873, it is possible that in more than one instance they may become operative in the future.

noneys of account. Col. I.—Chief country using the weight indicated by tokens. IV.—Name and weight onstants for ascertaining the ratio between gold and onstants in the silver table must be used as a divisor

V.	VI.
13·44 och-el-guerches	629·24936 och-él-guerches
3·28 pence	942·9955 pence
60·47 paras	4841·6490 piastres
61·51 reis	615·11646 milreis
6·43 centesimos	642·61198 pesos
6·65 cents	2067·1834 pesos
6·89 centavos	688·8888 cents
121·69 reis	1216·8733 pesos
8·61 kopecks	367·367 milreis
12·92 ,,	551·05095 kopecks
6·66 sens	250· ,,
13·33 ,,	500· yens
16·53 cents	1653·4391 ,,
7·28 centavos	728·454 guilders
18·21 ,,	1820·9026 pesos
2·24 annas	261·827 condors
3·28 ,,	382·20546 annas
24·8 ,,	1240· ,,
27·9 ores	1395·00213 crowns
13·77 pfennigs	688·895 marks
32·8 kreutzers	1640· crowns
34·44 hellers	3444·4444 ,,
34·44 centimes	francs

V.	VI.
2·99 cash	1·1296023 tael
·41 cents	40·826 dollars (trade)
·41 centavos	40·914994 pesos
·41 sen	15·457090 yens
·42 cent	42·328443 rix dollars
·43 ,,	42·800906 dollars
·44 centesimo	44·44444 sols
·49 ,,	49·382716 bolivianos
·55 kopeck	23·704185 kopecks
·22 phai-nung	1·0428306 ticals
·9 kreutzer	45· florins
1·8 pies	1·0909090 rupee
·48 shahis	1·111111 kran

are marked with an asterisk (*).

·4
505
47·
·124
·777
·072
1·714
·859
3·1968

ted with an

—Mint issue of gross and fine weights of metal in each y of account. VI.—Monetary sign for one grain of

V.			VI.	
		Grains.		
och-el-guerches	$\frac{1}{16}$	·0071	8·712464	och-el-guerches
penny	$\frac{1}{64}$	·0073	2·123863	pence
para	$\frac{1}{4}$	·0064	39·1848	paras
rei	„	·0062	39·858849	reis
centesimo ..	$\frac{1}{32}$	·0075	4·164058	centesimos
cent	„	·0072	4·306632	cents
centavo	„	·0070	4·46393	centavos
rei	$\frac{1}{2}$	·0063	78·852148	reis
kopeck	$\frac{1}{16}$	·0074	8·554803	kopecks
sen	„	·0072	8·63985	sens
cent	„	·0062	10·714112	cents
centavo	„	·0053	11·793352	centavos
pie	$\frac{1}{8}$	·0049	2·123863	annas
ore	„	·0077	16·07014	ores
pfennig ..	„	·0069	18·078906	pfennigs
heller	„	·0058	21·254048	hellers
centime	„	·0056	22·31964	centimes

V.			VI.	
		Grains.		
cash	$\frac{1}{8}$	·0645	1·93646	cash
cent	$\frac{1}{64}$	·0590	·2645	cent
„	„	·0589	·26512	centavo
sen	„	·0585	·26709	sen
			·2743	cent
cent	„	·0563	·2773	„
„	„	·0542	·2880	„
centesimo ..	„	·0488	·3200	„
kopeck	$\frac{1}{32}$	·0867	·36007	kopeck
solot	„	·055	·1409	phai-nung
kreutzer ..	„	·0535	·5830	kreutzer
pie	$\frac{1}{16}$	·0537	1·1636	pies
$\frac{1}{64}$ of shahis ..		·0499	·3128	shahis

b, asterisk(*).

m

TABLE VI.

Fixed Silver Pars.

Col. I. Name of country and chief money of account. Col. II. Each country's monetary sign for the weight of pure silver in the British Indian rupee at mint issue weight. Col. III. British Indian monetary sign for each chief silver money of account.

Col. I.	Col. II.	Col. III.
I. China, tael	319·5 cash	50·075 annas.
II. Mexico, dollar or peso	43·74 centavos	36·575 „
III. Japan, yen	44·07 sens	36·305 „
IV. Java, rix dollar	45·25 cents	35·353 „
V. Philippines, dollar	45·76 „	34·963 „
VI. Columbia, U.S., sol	47·52 centesimos	33·670 „
VII. Bolivia, boliviano	52·80 „	30·303 „
VIII. Russia, rouble	59·41 copecks	26·930 „
IX. Siam, tical	23·32 phai-nungs	21·945 „
X. Austria, florin	96·22 kreutzers	16·627 „
XI. Persia, kran	2·58 krans	6·190 „

TABLE VII.

Gold for Silver.

Col. I. Name of silver system. Col. II. Constant attached. Col. III. British par price of each silver money of account at a ratio of 33·31 parts of silver to 1 part of gold.

Col. I.	Col. II.	Col. III.
I. China	1096·773	32·92*d.*
II. Mexico	801·081	24·05*d.*
III. Japan	795·172	23·87*d.*
IV. Java	774·338	23·24*d.*
V. Philippines	765·782	22·99*d.*
VI. Columbia, U.S.	737·465	22·14*d.*
VII. Bolivia	663·717	19·93*d.*
VIII. Russia	589·843	17·70*d.*
IX. Siam	480·648	14·43*d.*
X. Austria	364·181	10·96*d.*
XI. British India	350·437	10·52*d.*
XII. Persia	135·791	4·07*d.*

As an instance of absolute metal pars, silver for gold, take the British Indian silver rupee price of each of the world's sixteen chief gold moneys of account at the ratio of 33·31 of silver to 1 part of gold.

TABLE VIII.

SILVER FOR GOLD.

Col. I. Name of gold system. Col. II. Constant attached in decimals of a rupee. Col. III. Price in rupees or annas obtained by multiplying the constant by the ratio, which is taken at 33·31.

Col. I.	Col. II.	Col. III.
I. Egypt	·69563	23·17 rupees.
II. Britain	·68458	22·81 „
III. Turkey	·61866	20·61 „
IV. Portugal	·15205	5·06 „
V. Uruguay	·145546	3·85 „
VI. U.S.A.	·140727	4·68 „
VII. Argentina	·135768	4·52 „
VIII. Brazil	·076861	2 56 „
IX. Russia	·072403	2·41 „
X. Japan	·071471	2·38 „
XI. Holland	·056566	1·88 „
XII. Chili	·051364	1·71 „
XIII. Scandinavia	·037713	1·26 „
XIV. Germany	·033523	1·10 „
XV. Austria	·028515	15·19 annas.
XVI. France	·027154	14·47 „

The chief factor in each of the world's seven present monetary and currency intermediaries is weight; a weight of gold or a weight of silver in each of twenty-five chief moneys of account on issue of the world's respective chief current coins from the mints; also the weight of pure metal indicated by tokens composing each chief money of account, as the penny the 240th of a pound, 1 centime the 100th of a franc. Table III. presents these weights in decigrams; Table IV. in grains. Besides these weights, each table presents a most valuable and important factor in the monetary sign in each system for 1 decigram or 1 grain of pure metal. The third most necessary and potent factor is the constant attached to each system in Col. VI. of Table III., by the use of which the daily fluctuating ratio between gold and silver can be easily determined.

The monetary sign for 1 decigram or 1 grain of pure metal is of high value in use in two directions: as a divisor and as a multiplier. As a divisor it determines the weight indicated by a monetary sign. As a multiplier it confers a monetary sign upon a given weight.

THE PRESENT MANNER OF QUOTING AND WORKING THE WORLD'S FOREIGN AND COLONIAL EXCHANGES OF INTERMEDIARIES.

In the *Times* of October 18th the following appears :—

Exchange on London at date October 14th, 1898.

Paris cheques	25 f. 32 c.
Brussels „	25 f. 35½ c.
Berlin sight	20 m. 45 pf.
Vienna „	12 fl. 04
Amsterdam „	12 fl. 12
Italy „	27 lire 49
Madrid „	38 ps. 10
Lisbon „	36½*d.* nom.
St. Petersburg, 3 mos. ..	93 r. 75
Bombay, T. T.	1*s.* 3 1/16*d.*
Calcutta „	1*s.* 3 1/16*d.*
Hong Kong, 4 mos.	1*s.* 11*d.*
Shanghai, T. T...	2*s.* 7⅞*d.*
Yokohama, 4 mos.	2*s.* 0½*d.*
Rio de Janeiro	8 9/16*d.*
Valparaiso, 90 days	13¼*d.*
Buenos Ayres paper dol. ..	18·97*d.*
„ gold pm. ..	151 p. c.

The above are seventeen quotations of exchange from nine European countries, three South American countries, and five from four Eastern countries on London. The quotations for eight European countries are in the currency of each of those countries for the British pound; the remaining one is in pence for a milrei. All the rest are in pence for the standard unit currency of each country. The three South American ones are inconvertible paper based on gold for pence. The two Indian ones, silver-cum-counter charge—i.e. fictitious rupee—for pence. The three remaining Eastern ones are automatic silver for pence. Eight of the nine European quotations are scientific; all the rest are not so. These eight are scientific because it is a variable rate in the country originating the transaction for a fixed rate in the country operated upon. The British rate on each of these countries should be variable pence for each country's chief money of account. Each of the nine other quotations should be a variable quantity of each country's intermediary for the British pound. For instance, take the quotation in Yokohama, 24 and ½ pence: it should be 9·79 yens for one pound; thus—

240 pence ÷ 24·5 = 9·79 yens.—Ans.

We will examine these quotations.

(*a*) Paris cheques 25 f. 32 c. What does this mean?

On Table IV. the monetary sign for 1 grain of gold attached to France is 22·3196 centimes (100 centimes in a franc). The sum is—

$$25{\cdot}32 \times 100 \div 22{\cdot}3196 = 113{\cdot}443 \text{ grains of pure gold.—Ans.}$$

By reference to Table IV. we find that the weight of pure gold in the sovereign is 113·0016, and rightly conclude that the quotation means francs and centimes for one pound. This shows that the Paris rate for cheques on London is at ·39 per cent. premium on par, weight for weight.

By reference to Table V., fixed gold pars, against France will be found 25·22 francs for one pound. The quotation 25·32 shows ·39 per cent. premium on par.

(*b*) Italy, sight, 27 lire 49. What does this mean?

The terms lire and franc indicate the same weight of metal, namely, 4·480359 grains of pure gold. 100 centesimi make 1 lire. The sum is—

$$27{\cdot}49 \times 100 \div 22{\cdot}3196 = 123{\cdot}165 \text{ grains of pure gold.—Ans.}$$

27 lire 49 centesimi being the rate upon London, this is the rate for one pound. This shows that the Italian rate is 8·9 per cent. above fixed par. This indicates that the intermediary consists of inconvertible paper based on gold to the extent of 7 per cent. premium in paper upon gold, since the cost of the transmission of metal, &c., would not perhaps exceed 1·9 per cent.

Lire and franc being terms for the same weight of gold, we turn to Table V., and against France find f. 25·22; this deducted from 27·49 shows 8·9 per cent. upon the lower figures.

(*c*) Shanghai T.T. 2*s.* 7⅛*d.* What does this mean?

It means that someone in Shanghai has bought or is prepared to buy or sell a telegraph transfer on London at the rate of 2*s.* 7⅛*d.* to be paid there for 1 tael paid in Shanghai. It is in its order an exchange of silver for gold, and not the other way round, an exchange of gold for silver. The scientific, common-sense, and straightforward quotation, therefore, is taels per pound. The sum is—

$$240d. \div 31{\cdot}875d. = 7{\cdot}53 \text{ taels per pound.}$$

Let us look this way at it, and afterwards in the present mode of quoting and working. The tael is 516·4058 grains of silver; the pound 113·0016 grains of gold. The ratio between the metals in London, 33·31 of silver to 1 of gold. What ratio is yielded between the metals by the Shanghai price of the pound? The sum is—

$$\frac{516{\cdot}4058 \times 7{\cdot}53}{113{\cdot}0016} = 34{\cdot}41 \text{ ratio of silver to 1 of gold.—Ans.}$$

The London ratio is 33·31 to 1. The difference between 33·31 and 34·41 is 3·3 per cent. on the smaller amount. This is a premium of 3·3 per cent. paid in Shanghai for the London equivalent at the ratio of 33·31 to 1.

Now we will look at the transaction as it is quoted, viz. a fixed rate in Shanghai for a variable rate in London. The weight of gold indicated by $31\frac{7}{8}d.$ is 16·008 grains of gold. The sum is—

31·75*d.* ÷ 2·1238*d.*, i.e. sign for 1 grain = 16·008 grains of gold.
516·4058 grains of silver ÷ 16·008 grains of gold = 32·26 of silver to 1 of gold.—Ans.

The difference between 32·26 and 33·31 is 3·25 per cent. on the smaller amount.

By reference to Table VII., gold for silver, against China 32·92*d.* is found as the equivalent British price for 1 tael at 33·31 parts of silver to 1 part of gold. This shows that London gives 3·15 per cent. less than absolute par for the tael.

(*d*) Calcutta $15\frac{15}{16}d.$ T.T. What does this mean?

As this means either a genuine silver rupee price in Calcutta for a portion of a pound sterling, or a fictitious rupee price for the same sum, first try whether it is a genuine rupee price by finding how many grains of gold the quotation indicates. 165 grains of silver in a rupee.

15·9375*d.* ÷ 2·123863*d.* = 7·50 grains of gold.

Take the ratio between the metals at 33·31 of silver to 1 of gold. Then—

$$\frac{7{\cdot}5 \times 33{\cdot}31}{165} = \text{rupee } 1{\cdot}51.\text{—Ans.}$$

We find it is a fictitious rupee, carrying a fictitious value of 50 per cent.

By reference to Table VII., against British India the equiva-

lent pence for 1 rupee at 33·31 to 1 is 10·52*d.* 15·9375*d.* shows that upon 10·52*d.* the premium is 48·2 per cent. The use of the monetary sign for 1 grain of pure metal is shown here as a multiplier. What is the British equivalent to 1 rupee at 33·31 to 1? The sum is—

$$165 \div 33{\cdot}31 \times 2{\cdot}123863d. = 10{\cdot}57d.\text{—Ans.}$$

(*e*) Rio de Janeiro $8\frac{9}{16}d.$ What does this mean?

$$8{\cdot}0625 \div 2{\cdot}123863d. = 3{\cdot}8 \text{ grains of gold.—Ans.}$$

In Table IV., against Brazil the weight of pure gold in the milrei will be found; it is 13·8348 grains. This indicates that the quotation is for an inconvertible paper milrei, and that the premium in paper upon the gold milrei is 261 per cent.

(*f*) Buenos Ayres 18·97*d.* What does this mean?

$$18{\cdot}97 \div 2{\cdot}123863d. = 8{\cdot}93 \text{ grains of gold.—Ans.}$$

In Table IV., against Argentina the weight of gold in the peso is 22·4017 grains of gold. This shows that the inconvertible paper is meant, and that gold in paper is at 150 per cent. premium.

Exchange between effective Gold and basal Gold Systems.

As an example:—It is desired to know the rate in London for an Argentine peso, the price of gold in the latter country being 150 per cent. premium in paper. The discount equivalent to 150 per cent. premium must be deducted from the par rate between the British Isles and Argentina. This par is found on page 74, and is 47·578 pence for one peso. 150 per cent. is equivalent to 60 per cent. discount. (See page 71 for process.)

The sum is—

47·578 pence — 60 per cent. discount = 19·031 pence: Ans.

Exchange between basal Gold and effective Gold Systems.

As an example:—Between the same countries as above. On page 75 the Argentine par with the British Isles is given in 504·431 centavos. The sum is—

504·431 centavos + 150 per cent. premium = 1260·877 centavos or 12 pesos 60·877 centavos: Ans.

Section EE.

THEORY AND PRACTICE OF THE CHAIN RULE.

COMPOUND arbitration or compound proportion, called the chain rule, which has existed from the time of Euclid, is better known and more widely practised on the Continent of Europe than in the British Isles.

It is particularly valuable in the exchanges of currency intermediaries, and highly serviceable in calculations of the exchanges of other things, especially where currency intermediaries form a part of the links. Facility of use of the chain rule depends on a quick discernment of the accurate formation of the chain to arrive at a true result of the given problem.

In a statement according to the chain rule the two terms in the same line, which in these pages are usually connected by the sign of equality, are not necessarily equal in the ordinary sense of the term, but they correspond to one another and are equivalent in respect of some feature or property. Thus it is absurd to say that three cows are equal to forty sheep, though they may be of equal money value. It is similarly absurd to say that so many street lamps are equal to so many dollars, though they may cost the dollars to keep them burning for a certain time. In these cases the symbol = should be understood to mean "corresponds to," and might be advantageously replaced by *c* or by *v* for *versus*.

The statement of the problem consists of two columns. The first line of the two columns states the question to be answered, the second line must begin with the same description of thing as the first ends with, and so on.

Let us analyze the following problem :—

The expense of supplying 2780 street lamps with oil amounted

in eight months to 6800 dollars, the cost of the oil was 12 dollars per cwt.; what will be the expense of 4777 lamps for 7 and ½ months in British money, the oil being at a cost of 20 dollars per cwt.? The British pound is 113·0016 grains of gold, the American dollar is 23·22 grains of gold.

The question is what is the cost of oil in British pounds for 4777 lamps under given conditions.

The first line therefore is,—

? (pounds) *v* 4777 lamps;

the second is the number of lamps for which 6800 dollars is paid,—

lamps 2780 *v* 6800 dollars;

the third is the dollars paid for the first purchase of oil,—

dollars 12 = 1 cwt.;

the fourth is the second price in dollars for a cwt. of oil,—

cwt. 1 = 20 dollars;

the fifth is the conversion of dollars into pounds through the equivalent weights of gold,—

dollar 1 *v* 23·22 grains of gold;
grains of gold 113·0016 *v* 1 pound.

We have now returned to the pound sterling, which constituted the first term, and the chain is complete; but we have to consider an entirely different element in the problem—namely, the period of burning of the lamps in the two cases. These periods do not form part of the chain, and do not come under the rule by which each line commences with the same description of thing as that with which the preceding line terminates. The two periods may, however, be treated as though they formed a supplementary link,—

months 8 *v* 7·5 months.

In some of the following examples two or three supplementary links dealing with premiums and discounts occur after the completion of the chain.

The fifth equation might with equal accuracy be,—

Dollars 4·8665 *v* 1 £

It would give the true chain sequence, but would hide the weights.

The following is the statement of the chain :—

? (pounds) *v* 4777 lamps
lamps 2780 *v* 6800 dollars
dollars 12 = 1 cwt.
cwt. 1 = 20 dollars
grains of gold 113·0016 *v* 23·22 grains of gold
months 8 *v* 7·5 months

$$\frac{\overset{85}{\cancel{\pounds}\cancel{8}\cancel{\pounds}} \quad 5 \quad 11{\cdot}61 \quad 2{\cdot}5}{4777 \times \cancel{\pounds}\cancel{8}\cancel{\pounds}\cancel{\pounds} \times 1 \times \cancel{7}\cancel{\pounds} \times \cancel{7}\cancel{8}\cancel{7}\cancel{7} \times \cancel{7}\cancel{\pounds}} = £3751{\cdot}60$$
$$\cancel{2}\cancel{7}\cancel{8}\cancel{\pounds} \times \cancel{1}\cancel{7} \times 1 \times \cancel{1}\cancel{1}\cancel{2}\cdot\cancel{\pounds}\cancel{\pounds}\cancel{1}\cancel{\pounds} \times \cancel{\pounds}$$
$$278 \quad \underset{1}{\cancel{2}} \quad 56{\cdot}5\ 08 \quad 1$$

"The Elements of Arithmetic," by P. Ghosh, in use in Indian schools and colleges, reached a twelfth edition in 1888. In this work the chain rule is made much of.

Schönberg's chain rule in English is a useful little tract, and can be obtained at Messrs. Effingham Wilson & Co.'s, Royal Exchange, for one shilling. It is the only entry upon the subject under the head of "Arithmetic" in the British Museum catalogue.

It will be observed that the chain rule is only a series of ratios, and the most practical way of dealing with it is to consider, *will the alteration in question increase or decrease the result?* Thus to consider the problem just exemplified. More lamps increase the result in the ratio, as $\frac{4777}{2780}$. Less time decreases, as $\frac{7 \text{ and } \frac{1}{2}}{8}$. Price increases, as $\frac{20}{12}$. The weight of the dollar is less than the pound, as $\frac{23{\cdot}22}{113{\cdot}0016}$, or to sum up,—

$$\$6800 \times \frac{4777 \times 7 \text{ and } \frac{1}{2} \times 20 \times 23{\cdot}22}{2780 \times 8 \times 12 \times 113{\cdot}0016} = £ \text{ required as before.}$$

Section III.

THE MECHANISM OF THE WORLD'S PRESENT PRICES, AND ITS SEVEN DIFFERENT SYSTEMS OF FOREIGN AND COLONIAL EXCHANGES OF INTERMEDIARIES.

I HOPE my exposition may justify the title which I have given to this most important sociological question. There are divers local prices of things. In the interest of backward countries, calico, tea, or other substances are used as intermediaries to facilitate the interchanges of things, and the substance thus used does the work of money as an equivalent—not as a token—in the exchange. Barter is the direct exchange of one thing for another. No intermediary is used in barter. All economists admit that barter is, or should be, the basis of all interchanges of things. My purpose is to prove by very simple arithmetical formula (1) that if the world possessed but one substance as its measure of value and equivalent in exchange, the world's interchanges of things could be effected on the conditions of barter. (2) That there are in the trading world at the present time seven different monetary and currency intermediaries, five of which are of a vastly different nature. (3) That these seven different intermediaries produce forty-two different prices of intermediaries, some of which either confer a bounty or impose a tax in international or intercolonial interchanges of things, resulting in the unfair encouragement of production of things in some countries and the handicapping of industries in other countries to an extent which can be measured by heavy percentages.

In the following examples of the working of the exchanges of intermediaries, weights of metal will be used in preference to monetary signs.

THE WHOLE WORLD'S FUTURE SINGLE INTERMEDIARY EXEMPLIFIED IN TRAVEL, COMMERCE, AND FINANCE: SCIENTIFIC AUTOMATIC GOLD.

THE FOREIGN AND COLONIAL EXCHANGES OF SCIENTIFIC AUTOMATIC GOLD FOR SCIENTIFIC AUTOMATIC GOLD.

Assume that the whole world's chief money of account consists of 6 grams of pure gold or 92·594 grains, with appropriate alloy to make one chief standard coin to bear the effigies of each mint issuing it; that monetary signs are gone for ever, and that the sole nomenclature of money is weight, and we have reached a haven of rest in the simplicity of prices and the world's foreign and colonial exchanges. One instead of seven measures of prices. Two proportions in the place of forty-nine different proportions at present composing the forty-eight different exchanges of the seven intermediaries. Examples will be given for the guidance of those who travel, who are engaged in commerce or deal in finance and stocks. Use will be made of the chain rule.

I. TRAVEL.

To convert forty gold coins bearing the Brazilian stamp into British gold in London. One-half per cent. would cover the cost of transmission of gold between the British Isles and Brazil. An eighth of 1 per cent. would be a fair profit. The sum is—

$$40 \times 6 - \tfrac{5}{8}\% = 238{\cdot}5 \text{ grams.—Ans.}$$

238·5 grams in British money for 240 grams of Brazilian money.

II. COMMERCE.

Silk in China at 4·875 decigrams of gold for 23·25 grams of silk, shipping insurance and all other charges exclusive of

freight to London, 10 per cent. on cost, the rate of exchange at 1 per cent. discount. What is the cost? The sum is—

? decigrams of gold = 23·25 grams of silk
grams of silk 23·25 = 4·875 decigrams of gold
100 = 110 with charges
discount on exchange 100 = 99

$$\frac{4{\cdot}875 \times 110 \times 99}{100 \times 100} = 5{\cdot}309 \text{ decigrams.—Ans.}$$

If the purchaser of the bill becomes at the same time the possessor of the silk, 5·107 is the cost of the silk to London without freight and charges, but if the seller of the bill still retains possession of the silk, he has not recovered what he has spent on the silk, and the deficiency he must obtain in a proportionate higher price at the time of sale.

Perhaps it may be roughly stated that at the present time, taking Austria, Hungary, and Japan as forming part, four-fifths of the world's trade in value is carried on by means of either an automatic gold or a gold-cum-counter-charge intermediary. Between these countries the extreme limits to the fluctuation of the exchanges may be taken at about 3 per cent.

III. Finance and Stocks.

I. A financier or Stock Exchange operator in London desires to know what would be the cost of property purchased in that city for 28,984·35 kilos of pure gold, and sent to China. Transmission, insurance, stamps, brokerage, time occupied in the transaction, and other charges being $2\frac{1}{2}$ per cent. The sum is—

28,984·35 + $2\frac{1}{2}$ per cent. = 29,708·96

II. Between the same places property bought at 84 per cent. What must it sell at to return the cost?

84 + $2\frac{1}{2}$ per cent. = 86·15 per cent.

Between two countries each of which is in possession of an effective gold standard the exchanges are conducted in precisely the same manner as in the above examples; the only difference being that the metric weights are used, and no monetary signs are introduced, the weight of pure gold, the thing signified, taking the place of the signs. Where coinage charges exist,

they are definite percentage charges affecting the exchange of the intermediary upon which the charge is imposed.

A miligram of gold is about the 448th part of a franc, and the French monetary sign for it is about ·22 of a centime; $\frac{1}{16}$ of a miligram is about the 7168th part of a franc; the monetary sign for the 6400th part of a franc is $\frac{1}{64}$ of a centime.

A miligram of gold is about the 7322nd part of a British pound; the British monetary sign for the 7680th part of a pound is $\frac{1}{32}$ of a penny.

When this system is adopted and maintained by the whole world, a price would be a definite weight of pure gold, and a rate of exchange would also be a definite weight of pure gold, and all ambiguity about the foreign and colonial exchanges would be gone for ever. Also the interchanges of things would be conducted on the conditions of barter.

THE WORLD'S PRESENT INTERCHANGES OF THINGS EFFECTED BY MEANS OF SEVEN INTERMEDIARIES.

Though the world may in the course of time use but one intermediary, there would be in the international and inter-colonial interchanges of things four prices and two rates of exchange of the one intermediary. Take A to denote the port of one country and B the port of another country. There would be two prices in A, one of the thing sent to B, and another of the thing received from B, and a rate of exchange consisting of a small percentage weight more or less than cost of the thing sent to B. Two prices in B, one of the thing sent to A and another of the thing received from it, and a rate of exchange on the cost of the thing sent to A. We have seen how that under one intermediary for the whole world the limit to the fluctuation of the exchange of the intermediary would be confined within the narrowest limits. Of the seven intermediaries with which we are about to deal, two—namely, the gold-cum-coinage charge one and the silver-cum-coinage charge one—are burdened with a fixed percentage charge. This charge varies from a small sum per mille to 2 per cent. To the extent of the charge it is an impediment in the interchanges of things, enhancing the inter-

national price of a thing received in the country imposing the charge.

THE WORLD'S PRESENT SEVEN MONETARY AND CURRENCY INTERMEDIARIES.

I. Scientific automatic gold as the British pound.
II. Scientific automatic silver as the Shanghai tael.
III. Gold-cum-coinage charge as the Australian pound.
IV. Silver-cum-coinage charge as the Mexican peso.
V. Silver-cum-counter charge as the Indian exchange rupee.
VI. Inconvertible paper based on gold as the Argentine peso.
VII. Inconvertible paper based on silver as the Columbian sol.

These seven different descriptions of intermediaries which are used in the interchanges of things within countries, and in the conduct of their foreign and colonial commerce, produce forty-nine different descriptions of exchanges of intermediaries, which are as follows: —

I. **Automatic Gold** for automatic gold, or for II. Automatic silver, or for III. Gold-cum-coinage charge, or for IV. Silver-cum-coinage charge, or for V. Silver-cum-counter charge, or for VI. Inconvertible paper based on gold, or for VII. Inconvertible paper based on silver.

VIII. **Automatic Silver** for automatic silver, or for IX. Automatic gold, or for X. Gold-cum-coinage charge, or for XI. Silver-cum-coinage charge, or for XII. Silver-cum-counter charge, or for XIII. Inconvertible paper based on gold, or for XIV. Inconvertible paper based on silver.

XV. **Gold-cum-coinage charge** for gold-cum-coinage charge, or for XVI. Automatic gold, or for XVII. Automatic silver, or for XVIII. Silver-cum-coinage charge, or for XIX. Silver-cum-counter charge, or for XX. Inconvertible paper based on gold, or for XXI. Inconvertible paper based upon silver.

XXII. **Silver-cum-coinage charge** for Silver-cum-coinage charge, or for XXIII. Automatic gold, or for XXIV. Automatic silver, or for XXV. Gold-cum-coinage charge, or for XXVI. Silver-cum-counter charge, or for XXVII. Inconvertible paper based on gold, or for XXVIII. Inconvertible paper based on silver.

XXIX. **Silver-cum-counter charge** for silver-cum-counter charge, or for XXX. Automatic gold, or for XXXI. Automatic silver, or for XXXII. Gold-cum-coinage charge, or for XXXIII. Silver-cum-coinage charge, or for XXXIV. Inconvertible paper based on gold, or for XXXV. Inconvertible paper based on silver.

XXXVI. **Inconvertible paper based on Gold** for inconvertible paper based on gold, or for XXXVII. Automatic gold, or for XXXVIII. Automatic silver, or for XXXIX. Gold-cum-coinage charge, or for XL. Silver-cum-coinage charge, or for XLI. Silver-cum-counter charge, or for XLII. Inconvertible paper based on silver.

XLIII. **Inconvertible paper based on Silver** for inconvertible paper based on silver, or for XLIV. Automatic gold, or for XLV. Automatic silver, or for XLVI. Gold-cum-coinage charge, or for XLVII. Silver-cum-coinage charge, or for XLVIII. Silver-cum-counter charge, or for XLIX. Inconvertible paper based on gold.

A necessary condition of a scientific automatic metal monetary standard, constituting an absolute measure of value and an equivalent in exchange, is that the substance so used should do its work without fetter or favour on the part of the Government. A coinage charge is a fetter. Legislation whereby a given weight of metal does the work of a larger weight is an impediment to trade imposed by Government. As, for instance, at the present time the British Indian rupee of 165 grains weight of pure silver does the work as an intermediary of 250 grains of silver, or 55 per cent. more than the intermediary used in effecting local exchanges, if not throughout the whole country, certainly on the seaboard of India, Ceylon, and Mauritius.

Another essential condition of an effective metal monetary system is that State and bank credit instruments in the shape of notes payable on demand are convertible into the weight of standard substance indicated upon the note at the will of the holder of the note without question, delay, or expense.

The term silver-cum-counter charge denotes that a Government by legislation has conferred a fictitious value upon silver. A counter is not meant for use at its intrinsic worth. Metal, to

do its work as money, is intended to pass as an intermediary in some near relation to the value factors contained in it in comparison with the value factors contained in the things for which it is exchanged. This is the meaning of the statement, "That money, i.e. standard money, is an equivalent in exchange."

A coinage charge adds to the cost of the goods imported into a country imposing the charge. A coinage charge does not benefit the export trade of a country imposing such a charge, since the metal forming its standard substance has no more worth in other intermediaries than the world's market price of silver as an article of commerce. The fact that a metal is an article of commerce largely required for other than currency purposes mainly constitutes its fitness for use as a measure of value and an equivalent in exchange.

Coinage charge on the standard substance being of a certain nature in each country, it becomes unnecessary to present in detail instances for the instruction of travellers, international and intercolonial traders, and financiers. In a chain rule statement of an operation between a country and another imposing such a charge, a link in the chain affecting the exchange of the intermediaries would be added; say the charge is $1\frac{1}{2}$ per cent.

$$100 = 101{\cdot}5$$

A traveller could never lose by this charge; he should sometimes gain, but the gain would never be much.

FACTORS IN THE WORLD'S PRESENT PRICES AND EXCHANGES OF INTERMEDIARIES.

We have seen that the day may come when the whole world shall have three factors in its money for all purposes. A weight of pure metal; a premium or more than a given weight; a discount or less than a given weight.

The world's seven present intermediaries constituting prices and the foreign and colonial exchanges embrace twelve factors, as follows:—

I. Weight of gold.

II. Monetary signs for weights of gold.

III. Weight of silver.
IV. Monetary signs for weights of silver.
V. Charge for coinage.
VI. Charge for constituting fictitious money by legislation.
VII. Charge in the shape of premium in paper for silver.
VIII. Charge in the shape of premium in paper for gold.
IX. Charge on the movement of metal.
X. Charge for the exchange of one currency for another.
XI. Fixed pars of exchange between intermediaries.
XII. Absolute pars of exchange of the day between intermediaries.

THE FACTORS WHICH ARE USED IN EACH CURRENCY SYSTEM.

I. **Automatic Gold.**—Weights and monetary signs for gold. A price in this system is a weight of pure gold. As an international intermediary; a charge on the movement of metal and a charge for the exchange of this currency for another play their part.

II. **Automatic Silver.**—The remarks upon automatic gold apply to automatic silver.

III. **Silver-cum-coinage Charge.**—Weights and monetary signs for silver, a fixed percentage coinage charge, a charge on the movement of metal, and a charge for the exchange of this currency for another. Price in this system is a silver-cum-coinage charge price.

IV. **Gold-cum-coinage Charge.**—The remarks under silver-cum-coinage charge apply to gold-cum-coinage charge.

V. **Silver-cum-counter Charge.**—Weights and monetary signs for silver with a variable percentage premium on silver to do the work of a heavier weight of silver; a charge on the movement of metal, and a charge for the exchange of this currency for another. The rate for the foreign and colonial exchanges of this system is a silver-cum-counter charge rate.

VI. **Inconvertible Paper based on Gold.**—Weights and monetary signs for weights of gold, a fluctuating percentage paper premium on gold which acts as an equivalent discount on the weight of gold in the chief money of account in use in

the system, a charge on the movement of metal, and a charge for the exchange of this currency for another. Price and a rate of exchange of the intermediary are both inconvertible paper based on gold price and rate of exchange.

VII. **Inconvertible Paper based on Silver.**—The remarks under inconvertible paper based on gold apply to inconvertible paper based on silver.

FIXED AND ABSOLUTE PARS OF EXCHANGE. RATIOS.

In working the forty-nine exchanges of the seven intermediaries the first step is to determine the fixed or absolute ratio between them. Fixed pars exist between countries the standard in which is of the same metal. Gold pars are different countries' different monetary signs for the same weight of gold. Silver pars are different countries' monetary signs for the same weight of silver. Absolute pars are subject to daily fluctuations, and depend upon the ratio of the day between the metals gold and silver, the fluctuating percentage bounty produced by a counter charge, or the discount on the weight of gold or silver resulting from the inconvertible paper premium on the metals. When the fixed or absolute pars are determined, then come into play in percentage form IX. and X., charge on the movement of metal and charge for the exchange of one currency for another.

N.B.—There is so much perplexity about the exchanges of intermediaries resulting from the unscientific teaching and practice in the world, that it should be thoroughly understood that the percentage deviation from fixed and absolute pars of exchange should always be taken on the currency of the country commencing the operation. Thus in the British Isles it would be a premium or a discount upon pounds, shillings, or pence for the currency of another country. This is the scientific method of working the exchanges. If I buy at a premium, I shall have less to receive than if I buy at par. If I buy at a discount, I shall have more to receive than if I buy at par.

Say a merchant or a financier buys something to send to another country, and sells his bill of exchange for the

purchase amount at a discount, it is evident that he has not received back the cost of the thing. By making his bill of such an amount that after deducting the discount the proceeds would equal the cost, is one way of meeting the difficulty. The other is by an enhanced price in the place where the thing is sold. If the bill is sold for more than the cost of the thing, the thing can be sold for less in the place it is sent to.

If a bill of exchange is sold at a premium on par, the seller obtains more than if it sold at par; whereas a buyer of the bill at a premium on par obtains less than if it sold at par.

The following would be the links in a chain rule sum :—

If a premium, say 50 per cent., is conferred on metal by legislation, the link in working for an answer in rupees would be—

$$100 = 150$$

The premium in paper upon gold or silver is also worked in the same manner; say the paper premium is 140 per cent., the statement is—

$$\text{paper } 240 = 100 \text{ metal}$$

When a shipper of goods sells his bill against the goods at a premium upon fixed or absolute par, he obtains more than the cost of his goods, and therefore can afford to sell them for less at the port of discharge: this premium must therefore be taken at an equivalent discount as a link in the chain ; say he has sold at $2\frac{1}{2}$ per cent. premium, the discount is 2·44 and the link would appear as—

$$100 = 97{\cdot}56$$

When a shipper of goods sells his bill against the goods at a discount upon fixed or absolute par, he obtains less than the cost of his goods, and therefore must obtain that amount more at the port of discharge, the discount therefore must be taken at an equivalent premium as a link in the chain ; say he has sold at $2\frac{1}{2}$ per cent. discount, the equivalent premium is 2·56 and the link result appear as—

$$100 = 102{\cdot}56$$

A percentage charge which adds to the cost of any thing would take its place in the chain as the less corresponding to

the greater; say the charge is 2½ per cent., the equation would be 100 = 102·5. Anything in the nature of a percentage which would diminish the cost of a thing would take its place in the chain as the greater corresponding to the less; say the discount is 2½ per cent., the equation would be 100 = 97·5.

We now proceed with sums illustrative of the exchanges of intermediaries.

I.

AUTOMATIC GOLD FOR AUTOMATIC GOLD.

I. TRAVEL.

State and other accounts in Canada are kept in dollars. The dollars of the U.S.A. and the British pound are legal tender. The mint issue weight of a dollar is 23·22 grains, that of a British pound 113·0016 grains. What amount in British money in London would $580 exchange at ½ per cent. discount command?

XII. The sum is—

? (£) = 580 dollars
$1 = 23·22 grains of gold
grains of gold 113·0016 = £1
100 = 99·5 discount

$$\frac{29 \times 11{\cdot}61 \times 1 \times 19{\cdot}9}{1 \times 56{\cdot}5008} = £118\ 11s.\ 10d.\text{—Ans.}$$

FIXED PARS OF EXCHANGE.

$4·866 = £1 Pence 49·316 = $1

II. COMMERCE.

XIII. What would be the cost of a lb. of silk in London purchased in Canada at $4 per lb., packing, shipping, insurance, and all other charges except freight to London, &c.—which is paid there—12 per cent.; and the discount in dollars for the pound, ½ per cent.?

If a bill of exchange is sold at a discount on par, the seller obtains less than if it sold at par; whereas a buyer of a bill at a discount on par obtains more than if it sold at par. As between two countries the one in which the rate of exchange is much above par is said to be against the country in which the high rate exists.

XIII. The sum is—

? (shillings) = 1 lb. silk
silk lb. 1 = 4 dollars
dollar 1 = 23·22 grains of gold
grains of gold 5·65 = 1 shilling
100 = 112 with charges
exchange 100 = 99·5

$$\frac{1 \times 4 \times \cancel{23{\cdot}22} \times 1 \times \cancel{112} \times \cancel{99{\cdot}5}}{1 \times 1 \times \cancel{5{\cdot}65} \times \cancel{100} \times \cancel{100}} = 18s.\ 4d.\ \text{per lb.—Ans.}$$

11·61 56 19·9
1·13 25 25

III. FINANCE AND STOCKS.

What is the cost of property in London bought in Canada at $18,976, stamps, insurance, commission, and all charges to London, 2 and ½ per cent.?

XIV. The sum is—

? (pounds) = 18,976 dollars
dollar 1 = 23·22 grains of gold
grains of gold 113·0016 = £1
100 = 102·5 with charges

$$\frac{\cancel{18{,}976} \times \cancel{23{\cdot}22} \times 1 \times \cancel{100{\cdot}5}}{1 \times \cancel{113{\cdot}0016} \times \cancel{100}} = £3996\ 6s.\text{—Ans.}$$

593 11·61 20·5
3·5313 10

Stock is quoted in London at 91 and ¼ per £100. What is the cost in the U.S.A. per £100, charges 2 and ½ per cent.?

XV. The sum is—

? (dollars) = £100 stock
stock £100 = £91·25
£1 = 113·0016 grains of gold
grains of gold 23·22 = 1 dollar
100 = 102·5 with charges

$$\frac{91{\cdot}25 \times \cancel{113{\cdot}0016} \times 1 \times \cancel{100{\cdot}5}}{1 \times 23{\cdot}22 \times \cancel{100}} = \$455{\cdot}17.\text{—Ans.}$$

28·2504 4·1
25
1

AUTOMATIC GOLD FOR AUTOMATIC SILVER.

The average of the gold prices of silver in London for 1872 is 60 and $\frac{5}{16}$ per standard ounce, giving the ratio of 15·64 parts of silver to 1 part of gold. The present ratio of silver to 1 of gold is 33·31, an increase of 113 per cent. In the past quarter of a century the silver price of gold has risen 113 per cent., and the gold price of silver has fallen 53·33 per cent. In August, 1897, the ratio was 39·5 parts of silver to 1 part of gold. The present ratio is taken in the following examples, and for the sake of comparison the ratio of 1872 will be taken.

I. TRAVEL.

A tael of silver is not a currency met with by travellers. But China uses the Mexican dollar as an intermediary in her foreign trade. The Chinese Government has not done anything to fetter or favour the Mexican dollar. It effects its work as a weight of pure silver. The percentage additional cost in silver for its manufacture into pesos including coinage charge in Mexico does not add to its value in international interchanges.

It is desired to exchange 285 Mexican dollars or a promise to pay them on demand of equal value with the dollars into British money. The Mexican peso or dollar is 377·181 grains of silver, and the pound is 113·0016 grains of gold; the ratio between the metals being 33·31, and the exchange dealers charge 1 and $\frac{1}{2}$ per cent.

XVI. The sum is—

? (pounds) = 285 dollars
dollar 1 = 377·181 grains of silver
silver 33·31 = 1 gold
grains of gold 113·0016 = £1
100 = 98·5

$$\frac{57 \qquad\qquad 19{\cdot}7}{\cancel{285} \times 377{\cdot}181 \times 1 \times 1 \times \cancel{98{\cdot}5}} = \text{£}28\ 2s.\ 8d.\text{—Ans.}$$
$$1 \times 33{\cdot}31 \times 113{\cdot}0016 \times \cancel{100} \qquad 4$$

There is another way of doing this sum. Find the par established between the dollar and the British shilling at the

given ratio. On the result deduct 1 and ½ per cent., and with that multiply the 285 dollars. The twentieth part of a pound is 5·65 grains of pure gold.

XVII. To find the par the sum is—

$$\text{ratio } \frac{377{\cdot}181 \text{ silver}}{33{\cdot}31 \times 5{\cdot}65 \text{ gold}} = 2{\cdot}004 \text{ shillings.—Ans.}$$

then 285 × 2·004 − 1½ per cent. = £28 2*s.* 7*d.*—Ans.

At the ratio of 15·64 parts of silver to 1 of gold the traveller would in 1872 have obtained £59 18*s.* for the 285 Mexican dollars. This can be discovered by substituting 15·64 for 33·31 in the above examples. A measurable difference which made a deep impression upon the mind of the traveller, who, if he did not trace the mechanism of the change, felt it in his pocket.

ABSOLUTE PARS OF EXCHANGE.

Ratio 15·64 to 1	Ratio 33·31 to 1
$4·68 = £1	$9·98 = £1
Pence 51·22 = peso 1	Pence 24·04 = peso 1

II. COMMERCE.

The price of silk in China is 816 taels per picul, all charges to London except freight 12 per cent., the rate of exchange 2 per cent. discount. 1 picul equals 140 lbs. av., the ratio between the metals 33·31 to 1; a shilling is the British sign for 5·65 grains of gold, the tael 516·4058 grains of silver.

XVIII. The sum is—

? (shillings) = 1 lb. av. of silk
lbs. 140 = 1 picul
picul 1 = 816 taels
tael 1 = 516·4058 grains of silver
silver 33·31 = 1 of gold
grains of gold 5·65 = 1 shilling
100 = 112 with charges
exchange 100 = ·98 discount

$$\frac{1 \times 1 \times \overset{51}{\cancel{816}} \times 516{\cdot}4058 \times 1 \times 1 \times \cancel{112} \times 98}{\underset{5}{\cancel{140}} \times 1 \times 1 \times 33{\cdot}31 \times 5{\cdot}65 \times \underset{25}{\cancel{100}} \times \underset{25}{\cancel{100}}} = 17s.\ 7d. \text{ per lb.}$$

For the same quality of silk and at the same price in China, the same charges, but the ratio between the metals at 15·64 to 1 the cost in the British Isles was 37*s.* 4½*d.* per lb.

III. FINANCE AND STOCKS.

How many taels will £100,000 purchase? The ratio between the metals 33·31; all charges for transmission and becoming possessed of the equivalent taken at 1 per cent.

XIX. The sum is—

? (taels) = 100,000 British pounds
British pound 1 = 113·0016 grains of gold
grain of gold 1 = 33·31 grains of silver
grain of silver 516·4058 = 1 tael
exchange 100 = 99

$$\frac{1000}{\not{1}\not{0}\not{0},\not{0}\not{0}\not{0}} \times \frac{56{\cdot}5008}{\not{1}\not{1}\not{3}{\cdot}\not{0}\not{0}\not{1}\not{3}} \times 33{\cdot}31 \times 1 \times 99 \Big/ 1 \times 1 \times \frac{\not{5}\not{1}\not{6}{\cdot}\not{4}\not{2}\not{5}\not{8}}{258{\cdot}2029} \times \frac{\not{1}\not{0}\not{0}}{1} = \text{taels } 721{,}611{\cdot}27.\text{—Ans.}$$

At the ratio of 15·64 to 1 this sterling amount would have commanded at the same percentage charge taels 338,817·17 only.

To reach absolute accuracy in large sums, not less than six decimal places should enter into the calculation. The ratio between the metals, as has been stated, is worked on 943; it is actually 942·9955 and more. The ratio has been taken at 33·31; it is actually 33·3066 and more. This difference in the factors upon the par of exchange for £100,000 in taels only amounts to 1 per 10,000 taels.

AUTOMATIC GOLD FOR SILVER-CUM-COUNTER CHARGE.

The term counter is used to denote that a State by legislation confers a fictitious value upon a substance as an intermediary in the interchanges of things. This can be done, as we see, by one State quite as easily as it was done by a combination of several States when they determined upon and effected *for a period* a legislative fixture of ratio between gold and silver whereby these metals for years exchanged at an approximate ratio of 15½ to 16 parts of silver to 1 part of gold all the world over. Both schemes are utterly in opposition to the science of money as propounded by the geniuses of the world who have paid

attention to the subject from Xenophon, in the fifth century before Christ, to the present time. The British Indian mints being closed against the reception of silver from the public, 295 millions of people inhabiting British India, Burma, Ceylon, and Mauritius have no standard measure of value and equivalent in exchange. The rupee of 165 grains of pure silver was their standard coin, and is now the measure of their internal interchanges. But as a measure of their international and intercolonial interchanges they now possess a silver-cum-counter-charge intermediary. At present the universal gold value, or price, of the rupee at 33·31 parts of silver to 1 part of gold is 5·27 grains of pure gold, the British monetary sign for which is 11·39 pence. The rate for telegraph transfers upon India this day is $15\frac{31}{32}$ pence per rupee. This shows that legislation resulting in the closure of the mints in British India, and a duty on silver has added a fictitious value of 40·2 per cent. to the intermediary used in the international interchanges of these 295 millions of people. In other words, the 165 troy grains of silver do the work of 231·33 grains of silver. The possession by India, Burma, Ceylon, and Mauritius of a scientific automatic gold standard, which it is devoutly to be hoped may be brought about, would be the justification for the temporary use of such a rotten intermediary.

I. TRAVEL.

What could be obtained in London for 760 rupees in bank or equally good credit notes, and for 84 silver rupees, the intermediary rupee having a 40 per cent. counter-charge premium charges 1 per cent. discount?

XX. The sum is—

? (British pounds) = 760 British rupees
rupee 1 = 165 grains of pure silver
silver 33·31 = 1 of gold
grains of gold 113·0016 = 1 British pound
100 = 140 with premium
100 = 99 exchange

$$\frac{190 \quad 33 \qquad\qquad 7}{760 \times 165 \times 1 \times 1 \times 140 \times 99} = £46\ 3s.\ 7d.\text{—Ans.}$$
$$\frac{}{1 \times 33{\cdot}31 \times 113{\cdot}0016 \times 140 \times 100}$$
$$28{\cdot}2504 \qquad 5$$
$$1$$

There is another method by which the same result can be reached, as given under absolute pars below. At 33·31 parts of silver to 1 part of gold, the £1 equals 22·81 rupees.

XXI. The sum is—

750 ÷ 22·81 + 40 per cent.−1 per cent. = £46 3*s.* 5*d.*—Ans.

In 1872, at the then ratio, 10·71 rupees equalled £1, the absolute par, and then at the same discount the 760 rupees yielded £69 6*s.* 9*d.*

Rupees are still the circulation of India, Ceylon, and the Mauritius; upon their import into India there is a charge of 5 per cent. Take the charge for converting the 84 rupees into sterling at 1½ per cent., charges for transmission to India, import duty, and time interest at 8 per cent., and the ratio of the day between the metals at 33·31 to 1.

XXII. The sum is—

? (pounds) = 84 rupees
rupee 1 = 165 grains of silver
grains of silver 33·31 = 1 grain of gold
grains of gold 113·0016 = £1
100 = 92 charges deducted
100 = 98·5 discount on exchange

$$\frac{21 \times 33 \times 1 \times 1 \times 23 \times 19{\cdot}7}{1 \times 33{\cdot}31 \times 7{\cdot}0626 \times 4 \times 100} = £3\ 6s.\ 7d.\text{—Ans.}$$

If, instead of being silver rupees, the 84 rupees had been in good Indian bank notes, their value at 15·75 pence for a rupee would have been £5 5*s.* 3*d.*

ABSOLUTE PARS.

Ratio 15·6 to 1.

Rupees 10·71 = £1
Pence 22·41 = 1 rupee

Ratio 33·31 to 1.

Rupees 22·82 = £1
Pence 10·51 = 1 rupee

Fictitious rupee 40 per cent. premium.

Rupees 16·31 = £1
Pence 14·71 = 1 rupee

The price of Indian telegraph transfers to-day is 15·29/32 pence per rupee, or rupees, 15·08 to the pound. The weight

at par being 10·51 pence per rupee, the fictitious exchange rupee shows a premium of 51·51 per cent.

II. COMMERCE.

What is the cost in London, without freight and London charges, of one pound of tea at 12 annas per seer? 112 lbs. equal to 60 factory seers, charges in India at 8 per cent., the exchange at 1 and ½ per cent. discount, and the exchange rupee at 50 per cent. premium upon the silver rupee; the ratio between gold and silver at 33·31. One penny is the sign for ·4708 of a grain of gold.

XXIII. The sum is—

? (pence) = 1 lb. av. tea
lbs. 112 = 60 seers factory
seer 1 = 12 annas
annas 16 = 1 rupee
rupee 1 = 165 grains of silver
grains of silver 33·31 = 1 grain of gold
grain of gold ·47 = 1 penny
100 = 150 premium on silver rupee
100 = 108 with charges
100 = 98·5 exchange discount

$$\frac{1 \times 6 \times 3 \times 1 \times 33 \times 1 \times 1 \times 75 \times 27 \times 1·97}{112 \times 1 \times 16 \times 1 \times 33·31 \times ·4708 \times 150 \times 108 \times 98·5} = 6·74 \text{ pence—Ans.}$$

III. FINANCE AND STOCKS.

At what amount per cent. of rupees in India must stock bought in London at £66 per £100 be sold for, the ratio between the metals being 33·31, the exchange rupee at 50 per cent. premium?

XXIV. The sum is—

Find the absolute par with a pound.

? (exchange rupees) = £1
£1 = 113·0016 grains of gold
gold 1 = 33·31 silver
grains of silver 165 = 1 rupee
premium 150 = 100

$$\frac{1 \times 113·0016 \times 33·31 \times 1 \times 150}{1 \times 1 \times 165 \times 100} = 15·208 \text{ rupees.—Ans.}$$

Convert £100 into rupees, and £66 into rupees, to which add 1½ per cent. Divide the result of the latter by the result of the former to find the percentage rupees for 100 rupees.

£100 × 15·208 = 1520·80
£66 × 15·208 + 1½ per cent. = 1018·784

$$\frac{1018{\cdot}784 \times 100}{1520{\cdot}80} = 66{\cdot}99 \text{ rupees per 100 rupees.—Ans.}$$

IV. AUTOMATIC GOLD FOR INCONVERTIBLE PAPER BASED ON GOLD.

Inconvertible paper, based upon one of the precious metals, is, perhaps, the most rotten intermediary which a country can use. A vast number of different communities use this wretched intermediary in Europe and the New World for both their internal and international interchanges of things. Nowhere throughout the East, among its 852 millions of peoples, is this abortive currency known. On the sea-boards of the trading communities of the world a definite weight of gold, or a definite weight of silver, is the professed standard measure of value and equivalent in exchange to which each country has attached a sign for its chief money of account, as the pound, franc, and peso or dollar.

I. TRAVEL.

What is the value in London of 617 pesos, consisting of the best notes of the Argentine Republic? The gold peso is 22·4012 grains of gold. Gold is at 157 per cent. premium there. Charges and risk amount to 4 per cent.

XXV. The sum is—

? (pound) = 617 paper pesos
peso 1 = 22·4012 grains of gold
grains of gold 113·0016 = 1 pound
premium 257 = 100
100 = 96

$$\frac{617 \times \overset{5{\cdot}6003}{\cancel{22{\cdot}4012}} \times 1 \times \cancel{100} \times \cancel{96}^{12}}{1 \times \overset{3{\cdot}5313}{\cancel{113{\cdot}0016}} \times 257 \times \cancel{100}_{1}^{1}} = £45{\cdot}68.\text{—Ans.}$$

Another method is to get at the absolute par between the intermediaries on the ratio of the day, the fluctuating factor being the paper premium on gold, and upon par in the money of the country in which the exchange is made to deduct the charge for the conversion of the foreign intermediary.

XXVI. The sums are—

? (shilling) = 1 paper peso
gold peso 1 = 22·4012 grains of gold
grains of gold 5·65 = 1 shilling
premium 257 = 100

$$\frac{1 \times 22{\cdot}4012 \times 1 \times \overset{20}{\cancel{100}}}{\underset{1{\cdot}13}{\cancel{5{\cdot}65}} \times 257} = 1{\cdot}5427 \text{ shillings.—Ans.}$$

Then—

617 × 1·5427 − 4 per cent. = £45·688.—Ans.

Fixed Pars.	Absolute par, gold at 157 premium.
Pence 47·575 = 1 peso	Pence 18·512 = 1 peso
Pesos 5·044 = £1	Pesos 12·96 = £1

II. COMMERCE.

What is the cost in the Argentine Republic of one hectogram of tea, without charges in Argentina? 4·536 hectograms equivalent to 1 lb av., the price in London 10*d.* per lb., charges in London 3 per cent., paper premium on gold in Argentina 150 per cent.; exchange 4 per cent. against Argentina; a penny signifies ·4708 grain of gold and ·224 grain of gold 1 centesimo.

XXVII. The sum is—

? (centesimos) = 1 hectogram of tea
hectograms 4·536 = 1 lb. av.
lb. 1 = 10 pence
penny 1 = ·4708 grain of gold
grain of gold ·224 = 1 centesimo
100 = 250 premium in paper
100 = 103 London charges
100 = 104 exchange

$$\frac{1 \times 1 \times 10 \times \overset{\cdot1177}{\cancel{\cdot4708}} \times 1 \times \overset{1}{\cancel{250}} \times 103 \times \overset{13}{\cancel{104}}}{\underset{\cdot567}{\cancel{\cdot4536}} \times 1 \times 1 \times \cdot224 \times \underset{2}{\cancel{100}} \times \underset{5}{\cancel{100}} \times 100} = 12{\cdot}41 \text{ centesimos.—Ans.}$$

The exchange of the intermediaries at the gold par of 5·044 pesos to the pound, instead of 12·96 pesos to the pound, would make the cost of the tea 4·96 centesimos, instead of 12·41 centesimos.

III. FINANCE AND STOCKS.

What amount of British money would 950,000 Argentine paper pesos command: 250 paper pesos equal to 100 gold pesos, the peso 22·4012 grains of gold, the pound 113·0016 grains of gold, the rate of exchange and charges 1 and ½ per cent. discount on the pounds?

XXVIII. The sum is—

? (pounds) = 950,000 paper pesos
paper peso 250 = 100 gold pesos
gold peso 1 = 29·40120 grains of gold
grains of gold 113·0016 = 1 pound
100 = 98·5 discount on exchange

$$\frac{19{\cdot}000 \times 1 \times 2{\cdot}80015 \times 19{\cdot}7}{\not{2}\not{5} \times 1 \times \not{1}\not{1}\not{2}\not{0}\not{0}\not{1}\not{6}\not{0} \times \not{0}\not{0}\not{0}} = £74{,}200{\cdot}44 \text{—Ans.}$$

$\not{2}\not{0}$ 14·12520 1
1

EFFECT OF A COINAGE CHARGE.

The operation of a coinage charge in the foreign and colonial exchanges can be exemplified in the currency of British India as it existed in 1872. The normal state of British Indian trade and financial obligations has for many years been a vast excess of exportation of agricultural, mineral, and manufactured products over the imports, necessitating a steady importation of the precious metals into the country. There have been periods during the past fifty years when silver has been exported to the West, but they have been rare, and of short duration. The coinage charge in British India was $2\frac{1}{5}$ per cent. This was a fixed charge adding to the sterling cost of the rupee, but not diminishing the rupee cost of the pound. Rupees received in the West would be procurable for remittance back to India, altering the rate of exchange by the charges upon the transaction.

What is the sterling cost of the rupee? The ratio between

the metals 15·64, the coinage charge 2 and $\frac{1}{5}$ per cent., the rupee 165 grains of silver, and ·4708 of a grain of gold a penny.

XXIX. The sum is—

? (pence) = 1 rupee
rupee 1 = 165 grains of silver
silver 15·64 = 1 gold
grain of gold ·4708 = 1 penny
100 = 102·2

$$\frac{1 \times \cancel{165} \times 1 \times 1 \times \cancel{102{\cdot}2}}{\cancel{15{\cdot}64} \times {\cdot}4708 \times \cancel{100}} = 22{\cdot}9 \text{ pence.—Ans.}$$

Without the coinage charge the sterling price of the rupee on the conditions given is 22·42 pence.

Cost with coinage.	Cost without coinage.
Pence = 22·9 rupee	Pence 22·42 = rupee
Rupee 10·47 = pound	Rupee 10·70 = pound

A few more instances for the traveller will be given, as these present a solution to the crux of the foreign and colonial exchanges of intermediaries.

VI.

EFFECTIVE GOLD FOR INCONVERTIBLE PAPER BASED ON GOLD.

TRAVEL I.

The premium on gold in Spain is, say, 98 per cent. The peseta and the franc indicate the same weight of pure gold, viz. 4·4803 grains. What is the absolute par of exchange in Paris on these factors for, say, 986 pesetas in paper? The weights being the same, it is a percentage sum.

XXX. The sum is—

? (gold francs) = 986 paper pesetas
98 per cent. paper pesetas 198 = 100 gold francs

$$\frac{493}{\cancel{986} \times 100} = 497{\cdot}97 \text{ gold francs.—Ans.}$$
$$\cancel{198}$$
$$99$$

Fixed gold pars.	98 per cent. premium on gold.
Franc 1 = 1 peseta	French cents 49½ = 1 peseta
Peseta 1 = 1 franc	Spanish „ 198 = 1 franc

The standard money of account in the two Republics of the Argentine and Paraguay is a peso of 22·4012 grains of gold: the premium on gold in the Argentine Republic is 140 per cent.; in Paraguay it is 600 per cent. What is absolute par of exchange in the Argentine for 8600 Paraguay State paper notes?

XXXI. The sum is—

? (Argentine paper pesos) = 8600 Paraguay paper pesos
600 per cent. premium 700 = 100 „ gold „
Argentine gold pesos 100 = 240 Argentine paper „

$$\frac{8600 \times 1 \times 12}{7 \times 1} = 2962{\cdot}85 \text{ paper pesos.—Ans.}$$

Fixed gold pars.

Argentine peso 1 = 1 Paraguay peso
Paraguay „ 1 = 1 Argentine „

Gold at 140 premium in Argentine Republic.
„ 600 „ Paraguay „

Argentine paper cents 34·28 = 1 Paraguay paper peso
Paraguay paper peso 2·92 = 1 Argentine „ „

VII.

INCONVERTIBLE PAPER BASED UPON SILVER.

Until 1890, for the most part, Peru, Bolivia, Costa Rica, Ecuador, Salvador, United States of Columbia, Guatemala, Honduras, and Nicaragua, with a population of 13½ millions, had currencies consisting of inconvertible paper based upon silver. The standard of these countries was professedly either gold or silver, at the option of the payer, at the legislative ratio of 15·5 parts of silver to 1 part of gold. Since the heavy increase of the ratio of silver to 1 of gold, most of these countries have shifted the nominal basis of their inconvertible currency from silver to gold. The Peruvian weights are those of all the other countries except Bolivia. The weights are: the gold chief money of account, 22·40175 grains of gold. The silver in the coin of the same name, 347·2278 grains. The Bolivian new silver weight is 312·505046 grains of pure silver, and this

country has declared for and possesses, or is about to possess, an effective silver monetary system, making the second with Mexico, on the American Continent, which clings for the present to a silver standard.

Let us assume that one of these eight other countries possesses for its internal and international intermediary inconvertible paper based on silver.

VIII.

INCONVERTIBLE PAPER BASED ON SILVER FOR INCONVERTIBLE PAPER BASED ON GOLD.

TRAVEL I.

What amount of Argentine paper pesos at 140 per cent. premium on the gold peso would 1650 paper pesos command at 110 premium on the silver peso? Charge for the exchange 4 per cent. ratio between the metals 33·31. The gold peso 22·4017 grains of gold. The Columbian silver peso 347·2278 grains of silver.

XXXII. The sum is—

? (Argentine paper pesos) = 1650 paper peso on silver
silver peso 1 = 347·2278 grains of silver
grains of silver 33·31 = 1 grain of gold
grains of gold 22·4017 = 1 gold peso
Argentine premium 240 = 100
100 = 210 silver premium
100 = 96 discount or exchange

$$\frac{33 \quad 173{\cdot}6139 \qquad\qquad 1 \qquad\quad 4}{1 \times 33{\cdot}31 \times 22{\cdot}4017 \times \frac{1}{1} \times \frac{1}{1} \times \frac{1}{1}} = 644{\cdot}94 \text{ paper pesos on gold.}$$

[—Ans.

IX.

DIRECT AND INDIRECT EXCHANGES OF INTERMEDIARIES.

If a bill is bought at a discount upon fixed or absolute par of exchange of the day, it will appear in the buyer's chain at a premium equal to the discount, say discount of 2 and ½ per cent. 2 and ½ per cent. discount is equal to 2·56 per cent. premium; the chain in the buyer's sum would be 100 *v.* 102·56.

If a bill is sold at a discount upon a fixed or absolute par of exchange of the day, it would appear in the seller's chain as at

the full discount, say discount 2½ per cent.; the chain would be 100=97·5.

If a bill is bought at a premium on a fixed or absolute par of exchange, say 2 and ½ per cent., the buyer's link in the chain would be 100=102·5.

If a bill sold at a premium on a fixed or absolute par of exchange, say 2 and ½ per cent., an equivalent discount to the premium would appear on the seller's link, thus 100=97·44.

In Argentina and China the ratio between the metals may differ from that in London. Take 34·61 as the rate in Argentina and 31· in China. To bring these into the chain the gain in Argentina is 4·56 per cent., and the loss in China is 6·37 per cent. compared with London; the links to be introduced would be—

100 = 104·56
100 = 93·63

Indirect exchanges of intermediaries often yield a better result to the remitter than a direct exchange. By simultaneous purchases and sales in many different markets, or in a few different markets, this may be accomplished. It is desired to send a sum of money from the British Isles to India. The direct operation between London and Calcutta will be shown, and the indirect through the Argentine Republic and China will follow. Assume that the exchanges are for telegraph transfers. What will the pound yield in silver-cum-counter-charge rupees? The ratio between the metals, 33·31, the fictitious value of the silver rupee 50 per cent., the discount upon the sterling 2 and ½ per cent. The pound 113·0016 grains of gold. The rupee 165 grains of silver. Two and a half per cent. discount is equivalent to 2·56 per cent. premium to the buyer of the bill.

XXXIV. The sum is—

? (fictitious silver rupee) = £1
£1 = 113·0016 grains of gold
grain of gold 1 = 33·1 grains of silver
grains of silver 165 = 1 silver rupee
premium on silver 150 = 100
100 = 102·56

$$\frac{\overset{1}{\not{£}1} \times 113{\cdot}0016 \times 33{\cdot}31 \times 1 \times \overset{1}{\not{1}\not{6}\not{5}} \times 102{\cdot}56}{1 \times 1 \times \underset{1}{\not{1}\not{6}\not{5}} \times 150 \times \not{1}\not{0}\not{0}} = 15{\cdot}60 \text{ fictitious rupees.—Ans.}$$

The absolute par is obtained by leaving out the discount on par paid for the fictitious rupee. The par, Indian price, is 15·208 rupees for one pound.

The following is an arbitrated sum of exchange with telegraph transfers between the British Isles and British India through the Argentine Republic and China, which embraces the world's present great diverse intermediaries, namely, automatic gold, automatic silver, silver-cum-counter-charge, and inconvertible paper based on gold. The paper price of gold in the Argentine is 140 per cent. premium. China's intermediary is automatic silver. A remitter in London pays for a telegraph transfer upon Rosario 2½ per cent. dis., equal to 2·56 premium to him for paper at 140 per cent. premium on gold; his agent in Rosario invests the proceeds at the same premium in a T.T. on China at 6 per cent. discount, equal to 6·37 per cent. premium: his agent in China invests the proceeds in a T.T. on Calcutta at 1 per cent. premium, equal to 1 per cent. discount. The ratio between gold and silver 33·31 the same in London, Rosario, Shanghai, and Calcutta. How does this circuitous remittance compare with the direct one?

XXXV. The sum is—

? (fictitious silver rupee) = £1
£1 = 113·0016 grains of gold
grain of gold 1 = 33·31 grains of silver
grains of silver 165 = 1 silver rupee
premium on silver 150 = 100
100 = 102·56 discount in London
paper premium in London 240 = 100
100 = 240 paper premium in Rosario
100 = 106·37 discount on Rosario
100 = 99 premium in Shanghai

$$\frac{1\times 33{\cdot}31\times 1\times 102{\cdot}56\times 53{\cdot}19\times 33}{0\times 1\times 55\times 75\times 1\times 1\times 1\times 25\times 25\times 100} = \left\{\begin{array}{l}16{\cdot}43\\ \text{fictitious}\\ \text{rupees.}\\ \text{—Ans.}\end{array}\right.$$

The result of the circuitous course of exchange, compared with the direct, shows that there is a gain by the former over the latter of 5·32 per cent. By deducting the percentage premium from the percentage discounts, 5 per cent. is shown. The addi-

tional ·32 per cent. gain results from the treatment of the discounts as premium and the premium as a discount, together with the increased or decreased amount at each stage of the operation. The weight of silver for the weight of gold once stated in this operation, it was needless to introduce it into the sum, as also it is needless to have introduced the premium in paper on gold in the Argentine, the premium being taken in London and in Rosario at the same rate. The fifteen variable factors which could be introduced into a circuitous bill operation through countries using the four intermediaries embraced in the foregoing operation are for the three bills. Credit, 3 classes of. Usance, from sight to 6 months' sight, 3; local rates of discount, 3; altered ratio between gold and silver, 2; paper premium on gold, 2; fictitious value of silver, 2. It will be noticed that nine out of these variable factors would play their part in the exchange even though an effective metal monetary system on one metal existed in the four countries.

The absolute par of exchange in this arbitrated sum of exchanges is 15·208 rupees for one pound. The percentages for charges resulting from various causes upon this sum at various stages of the operations, added or deducted, brings out the same result as the chain rule sum, thus—

15·208 + 2·58 per cent. + 6·38 per cent. − 1 per cent. = 16·43 rupees.

To reach the absolute par there are three variable factors. X, variable rates between the metals. Y, variable bounty upon silver conferred by legislation. Z, variable inconvertible paper premium upon gold. Under X we are dealing with substances, weights, real and only money. In teaching it is all important that the naked weights of money should be pressed home upon the minds of the taught. The other two factors can be dealt with in the shape of premium or discount upon weights of money. Besides fixed and absolute pars there are percentage more or less charges upon such pars resulting from—different credit, different usance of bills, different local rates of discount, coinage charge, transmission of metal charge, and commission where an agent is employed. To these last we attach the sign ϕ.

Such a chain rule sum as that illustrated, but with all possible variations, might be presented thus :—

? (fictitious silver rupees) = £1
£1 = 113·0016 grains of gold
in London grain of gold 1 = 33·31 grains of silver X
grains of silver 165 = 1 rupee
Z Indian legislative premium 150 = 100
2½ per cent. discount in London 100 = 102·56 in Argentine ϕ
Z Argentine paper premium 240 = 100 in London
Z Argentine paper premium 100 = 238 in Argentine
X ratio of silver to gold 1·8 per cent. premium 33·31 } 100 = 101·8 in Argentine
discount in Argentine upon China 100 = 106·37 premium ϕ
1 per cent. premium in Shanghae on India 100 = 99 discount ϕ

With this instruction and examples every youth, before finishing scholastic education, should have perfect command over the forty-nine different currency exchanges at present existing in the world.

RATIOS OF SILVER TO 1 OF GOLD IN THE WORLD'S MINTAGES.

In 1870 the ratio of pure silver to 1 of pure gold between the chief money of account and the chief metal token—the token metal being of a different nature—in each monetary system was as follows : —

(g.) attached to the name of country indicates the gold system, (s.) the silver system, (d.) denotes the dual standard system : the meaning of this latter is that either metal in unlimited quantity is legal tender *at the option of the payer*.

Germany (g.) 13·95. Portugal (g.) 14·09. Brazil (g.) 14·22. Uruguay (d.) 14·40. Scandinavia (g.) 14·88. British Isles (g.) 14·29. British India (s.) 15·00. Russia (s.) 15·00. Egypt (g.) 15·00. Turkey (g.) 15·10. Austria (s.) 15·30. France (d.) 15.50. Italy (d.) 15·50. Belgium (d.) 15·50. Switzerland (d.) 15·50. Spain (d.) 15·50. Greece (d.) 15·50. Argentina (d.) 15·50. Paraguay (d.) 15·50. Columbia (s.) 15·50. Bolivia (s.) 15·50. Peru (s.) 15·50. Ecuador (s.) 15·50. Venezuela (d.) 15·50. Most of the 8 if not all the central possessions of

America come under 15·50 (d.) ratio. Netherlands (g.) 15·60. Philippines (s.) 15·79. United States N.A. (d.) 16·00. Japan (d.) 16·17. Chili (d.) 16·39. Mexico (s.) 16·51.

The following changes have taken place or are being striven after, all of recent origin.

Russia has constructed a fresh gold rouble money of account of 7·7412 decigrams of pure gold, the old gold rouble being 11·6118 decigrams. This 7·7412 decigrams or 11·9465 grains of pure gold, compared with the silver rouble in which there is no change, 179·961 decigrams of pure silver, shows the ratio between the metals at 23·25 parts of silver to 1 of gold.

Japan has constructed a new gold yen money of account of 7·5 decigrams of pure gold, the old gold yen being 15 decigrams. The silver yen continues the same, viz. 242·607 decigrams of pure silver. This shows the ratio at 32·48 parts of silver to 1 of gold.

Chili has constructed, under the name condor, a new standard money of account of 5·4917 decigrams. The peso contained 13·7277 decigrams of pure gold. The unchanged silver peso contains 225 decigrams of pure silver. This shows the ratio of 40·97 parts of silver to 1 part of gold.

Austria has coined a new chief gold money of account, under the name crown, of 3·0487 decigrams of pure gold. There is no change in the silver gulden or florin, which remains at 111·1111 decigrams of pure silver. This shows a ratio of 36·44 parts of silver to 1 part of gold.

British India aims at a gold standard. A rupee to contain 4·8816 decigrams of pure gold in place of the old gold rupee of 7·1279 decigrams. The silver rupee to continue the same, 106·9182 decigrams of pure silver. This shows the ratio between the metals as 21·90 parts of silver to 1 part of gold.

Bolivia has constructed a new silver standard money of account, and coin. The boliviano of 202·5 decigrams of pure silver. No change has been made in the weight of gold indicated in 1870, viz. 14·5161 decigrams. This shows a ratio of 13·95 parts of silver to 1 part of gold.

Of the 40 countries mentioned or alluded to above, it will be noticed that in 1870 22 countries possessed or claimed the

double standard, 9 countries the gold standard, and 9 countries the silver standard.

I do not know of any country in the world now that professes to possess or expects to regain a double standard.

Chief Moneys of Account.—The trading world at the present time either possesses, or has set itself to possess, seventeen effective gold standard chief moneys of account and eight effective silver standard chief moneys of account.

Among the seventeen chief moneys of account there are fourteen confined to the use of fourteen governments. The French franc, 2·903225 decigrams or 4·480359 grains on issue from the mint, is under the same name the chief money of account in Belgium and Switzerland. Italy, lira; Spain, peseta; Greece, drachma; Bulgaria, leva; Servia, dinar; Roumania, leu; Venezuela, bolivar. These ten governments adopted the same weight of gold as their chief money. The Argentine peso, the mint issue weight of pure gold in which is 14·516129 decigrams, or 22·401743 grains of pure gold, is exactly five times the weight of the franc. This is the weight of the following government chief gold coins:—Peru, sol; Paraguay, peso; Hayti, gourde; Costa Rica, peso; and some other of the Central American Republics. British India, Burmah, Ceylon, and Mauritius at present have no effective standard. The British and Indian Governments aim at the possession of a gold standard for these countries in a rupee equivalent to 16 pence, to contain one-fifteenth part of the pure gold in the sovereign at mint issue weight.

Among the eight chief silver moneys of account which are used by Shanghae, Mexico, Philippines, Columbia, Bolivia, Siam, Persia, and Corea, the silver chief coin so largely current in many of the Central and South American Republics is five times the weight of the silver franc, being 225 decigrams or 347·2278 grains of pure silver on issue from the mints. The Mexican dollar of 244·4092 decigrams or 377·1809 grains of pure silver, the Japanese yen and British dollar of 242·6076 decigrams or 374·4000 grains of pure silver, are very largely the currency of parts of Asia and the islands of the Indian and Pacific Oceans.

CONCLUSION.

Every properly educated person should possess a theoretical and arithmetical knowledge of the world's present mechanism of the interchanges of things. This knowledge is the safe foundation on which to erect the science of money. In 1883, on the recommendation of the late Professor Stanley Jevons, I procured a copy of "Money" by the late Professor F. A. Walker. Jevons recommended the work as the best authority upon money. The perusal of it was a great disappointment to me. I consider the instruction in it springs from an entire misconception of what money is, and that it is the worst guide to the subject that has ever been written since Locke's time. Anything and everything which, under certain conditions, does the work of money he says is money—a fundamental error from which is born all the wild, impracticable schemes of currency which ceaselessly flow from uninstructed or disordered brains. In the early years of this decade, being convinced of the great importance of true definitions upon such a vastly important subject as money, I formulated, and have ever since most persistently held, that the absolutely correct definition of money is "The standard substance in the shape of bullion and coin appropriated to currency purposes." This little work most clearly and prominently shows that credit instruments, that is, from a book debt to a State bank-note, is not money; that no description of token is money; that a coinage charge, a counter charge, a premium on the standard substance conferred by inconvertible paper, are not money. It is conclusively shown that all money is currency, but that all currency is not money. I desire to indelibly fix this truth on mankind. As soon as I possessed this profound conviction I mentioned my definition to two professional economists, one in England, the other in Ireland. I could not forbear from telling them that in my humble judgment I did not think they would ever understand money, or teach it properly, till they accepted my definition. They neither of them could see it. I have been led to study, compare, and write upon Archbishop Whately's "Easy Lessons on Money Matters for the Use of Young People," produced in the forties of this century, and Professor Jevons' "Political Economy," a Science Primer edited by Professors Huxley, Roscoe, and Balfour Stewart in 1878. I consider the earlier writer the sounder of the two. The first authority makes money his first subject, the second his twelfth.

The insight into the science of money and its use to be met with in the completed work of the India Office Committee on British India's future standard currency, especially in the evidence and papers of Lord Rothschild, Messrs. Alfred de Rothschild, Robert Campbell, W. H. Holland, E. A. Hambro, and Sir John Muir, present a strong contrast to the comparative worthlessness of the work of the meetings on money and its functions which have preceded it. Of very vast and world-wide importance are the two documents to which Mr. Campbell's name is attached. These raise questions which have yet to be threshed out.

I. The reasons for 16 rupees to the pound instead of 15 to the pound should have the serious attention of British Indian statesmen.

II. The denunciation of borrowing for the purpose of securing the standard metal, in the light of past experience should prevent such a course anywhere in the future history of the world.

III. The fundamental principle of fair trade from which the question arises, whether or not exports from a country which confers upon them unnatural and unfair bounties should be burdened with an import duty equivalent to the bonus by all other countries to which they are sent?

Should British India's chief gold money of account be made 16 rupees to the pound, the tables herewith will be found useful by adding 6·6 per cent. to the rupee pars with the other 16 chief gold moneys of account and by deducting 6·25 per cent. on the pars of the 16 other chief gold moneys of account with British India.

These pages contain the foundation to topstone of my work upon the exchanges. They should gain the attention of all students of sociology. They also form an appropriate Christmas gift to any boy or girl whose interest is awakened as to what money is and how it does its work. May they help forward, and that soon, the appearance of a popular lecturer upon this vastly important subject of money.

I shall esteem it a favour if any discovery of error in the pamphlet is at once communicated to me.

Section IV.—I.

TABLE IX.

WEIGHTS OF THE WORLD'S PRESENT AND PROSPECTIVE GOLD AND SILVER COINS.

Table of weights of gold and silver coins on issue from the mints. These coins are, or should be, current in the World's present twenty-nine monetary systems. Col. I.—Pure gold or pure silver in 1000 parts of metal. Col. II.—Proportion of silver to 1 of gold between the weights of both indicated by one money of account under mintage regulations. Col. III.—Names of the coins. Col. IV. —Total weight and weight of pure gold (g.) and pure silver (s.) in decigrams. Col. V.—Total weight and weight of pure gold and pure silver in grains.

	Col. I.	Col. II.	Col. III.	Col. IV. Decigrams.		Col. V. Grains.	
				Total weight	Weight of pure metal	Total weight	Weight of pure metal
I.	875·0	15·0	Egyptian pound	g. 85·000	74·375	131·1749	114·7781
	900·0	—	10 piastres	s. 125·000	112·5000	192·9043	173·6139
II.	916·667	14·287	British pound	g. 79·881	73·224	123·2740	113·0016
	925·0	—	1 shilling	s. 56·552	52·310	87·2250	80·72937
III.	916·667	15·1	Turkish pound	g. 72·16	66·147	111·3598	102·0798
	830·0	—	20 piastres	s. 240·55	199·650	371·2313	308·1168
IV.	916·667	14·09	Portuguese 5-milreis ...	g. 88·675	81·285	136·8460	125·4425
	916·667	—	5 testoons	s. 125·000	114·583	192·9043	176·8284
V.	917·0	14·4	Uruguay 5-peso	g. 84·850	77·807	130·9435	120·0750
	900·0	15·5	1 peso	s. 250·000	225·000	385·2087	347·2278
VI.	916·667	14·3	Newfoundland 2-dollars ...	g. 33·280	30·507	51·35886	47·07895
	925·0	—	50 cents	s. 117·820	108·983	181·8234	168·1871
VII.	900·0	16·0	United States 5-dollars ...	g. 83·591	75·232	129·0000	116·09985
	900·0	—	1 dollar	s. 267·290	240·567	412·5000	371·2514
VIII.	900·0	15·5	Argentine Republic 5-dols.	g. 80·645	72·5805	124·5415	112·00875
	900·0	—	1 dollar or peso ...	s. 250·000	225·000	385·2087	347·2278
IX.	—	—	Cuba	—	13·933	—	21·5019
X.	900·0	16·39	Chili 5-peso	g. 76·265	68·639	117·6941	105·9253
	900·0	—	1 condor	g. 5·991035	5·49178	9·245578	8·4751138
	900·0	—	1 peso	s. 250·000	225·000	385·2087	347·2278
XI.	916·667	14·22	Brazil 10-milreis	g. 89·648	82·178	138·34793	126·81957
	916·667	—	2 milreis	s. 255·000	233·750	393·5249	360·7311
XII.	983·0	15·6	Netherlands 10-guilders ...	g. 67·20	60·48	102·6682	93·3348
	945·0	—	1 guilder or florin ...	s. 100·000	94·500	154·3235	145·8357
XIII.	900·0	14·88	Danish 20-crowns	g. 89·606	80·645	138·2831	124·45442
	800·0	—	2 crowns	s. 150·000	120·000	231·4852	185·1882
XIV.	900·0	13·95	German 20-marks	g. 79·65	71·6846	122·917896	110·626801
	900·0	—	1 mark	s. 55·555	50·000	85·7359	77·1617
XV.	900·0	15·5	French 20-francs	g. 64·516	58·065	99·56334	89·60701
	900·0	—	1 franc	s. 50·000	45·000	77·0417	69·4455
XVI.	A weight	No coin	Shanghae tael	s. —	334·6254	—	516·40584
XVII.	900·0	—	Trade dollar	s. 272·156	244·940	420·0000	378·0000
XVIII.	902·778	16·0	Mexican dollar	s. 270·73	244·40918	417·7847	377·18098
	875·0	—	16 pesos	g. 270·643	236·813	417·6657	365·45753
XIX.	945·0	—	Java dollar or 2½ guilders.	s. 250	236·25	385·8087	364·58925
XX.	900·0	16·173	Japan 1-yen	s. 269·564	242·607	416·0000	374·4000
	—	—	5 yens	g. 83·3335	75·000	128·60317	115·74262
	900·0	—	1 yen	g. 8·3333	7·5	12·86029	11·57426
XXI.	900·0	15·79	Philippine dollar	s. 259·600	233·64	400·6253	360·5628
	875.0	—	1 peso	g. 16·915	14·796	26·0961	22·83705
XXII.	900·0	15·5	Peruvian sol	s. 250·000	225·000	385·2087	347·2278
	—	—	10 sols	g. 161·290	145·161	248·90837	224·01753
XXIII.	—	—	Tripoli mahbub	s. —	202·957	—	313·2000
XXIV.	868·056	15·0	Russian rouble	s. 199·957	179·961	308·5806	277·7221
	900·0	—	5 roubles	g. 64·510	58·059	99·5540	89·5986
	900·0	—	1 rouble	g. 8·60134	7·741206	13·2739	11·946505
XXV.	910·0	—	Siamese tical	s. 151·805	133·670	234·2711	206·2850
XXVI.	900·0	15·3	Austrian florin	s. 123·457	111·111	190·5231	171·4708
	900·0	—	8 florins	g. 64·516	58·065	99·563349	89·60701
	900·0	—	1 crown	g. 3·387534	3·04878	5·22776	4·704986
XXVII.	916·667	15·0	Indian rupee	s. 116·638	106·918	180·0000	165·0000
	916·667	—	15 rupees	g. 116·638	106·918	180·0000	165·0000
	916·667	—	1 rupee	g. 5·32537	4·88158	8·21831	7·53344
XXVIII.	900·0	13·37	Persian kran	s. 46·0034	41·4298	71·04	63·936
	990·0	—	1 thoman	g. 34·667	34·321	53·49032	52·96536
XXIX.	900·0	15·86	Tunis 1-piastre	s. 30·970	27·875	47·7939	43·0145
	900·0	—	50 piastres	g. 97·600	87·840	150·61973	135·55776
XXX.	9·16	—	Bolivia	s. 225·	202·5	347·2278	312·50504

II.

RULES AND EXAMPLES FOR FINDING THE EQUIVALENT PREMIUM TO A GIVEN DISCOUNT, AND VICE VERSÂ.

ALL charges for coinage and those connected with the transmission of standard metals, &c., and which cause the deviation from par in rates of exchange, assume a form of percentage which can be deducted from or added to the fixed and absolute pars of exchange for any sum of money, or may be taken upon the total sum exchanged.

In the present mode of quoting and working the exchanges, the charges are expressed in the quoted rates.

EQUIVALENT PREMIUM TO A GIVEN DISCOUNT.

I. Whenever a paper currency exists at a discount compared with the metal standard for which it should exchange at par, and it is desired to know the equivalent premium on the metal standard, an example of the method to find it is attached.

EXAMPLE I.—Say the paper currency is at a discount of 74·747 as compared with gold in the Argentine Republic, what is the percentage premium on the gold expressed in paper?

Here 100 is worth only 25·253.

$$\therefore \frac{100 \times 100}{25{\cdot}253} \text{ is worth 100,}$$

or 396 nearly is worth 100.

That is to say, a discount of 25·253 is equivalent to a premium of 296 nearly.

EQUIVALENT DISCOUNT TO A GIVEN PREMIUM.

EXAMPLE II.—Premium on gold in the Argentine Republic 296 per cent., at what percentage discount is the paper?

Here 100 is worth 396.

$$\therefore \frac{100 \times 100}{396} \text{ is worth 100.}$$

That is to say, a premium of 296 is equivalent to a discount of 74·747 nearly.

III.

FOR ADJUSTING EXCHANGE TO AN INVOICE OF GOODS WHEN EXCHANGE IS WORKED BY PREMIUM AND DISCOUNT ON ONE FACTOR.

Exchange is quoted in London on Melbourne at 3 per cent. discount (I.) for a 60 days' sight bill, or at 1 per cent. premium (II.) for a demand bill; what amount must be added to or deducted from the invoice to produce the amount of the invoice by the sale of the bill of exchange for the same?

RULE.—Multiply the invoice by 100, and divide the result by

(I.) 100 — the discount, if the exchange be at a discount.
(II.) 100 + the premium, if the exchange be at a premium.

The rate of discount on the first sum, or the rate of premium on the second sum, will bring the respective invoice amounts to the sums to be received from the purchaser of the bills, less the discount, or plus the premium.

TABLE X.

MULTIPLES FOR THE CONVERSION OF DECIGRAMS INTO GRAINS.

1	decigram =	1·54323563905	grain
2	„	3·08647127810	„
3	„	4·62970691715	„
4	„	·17294255620	„
5	„	7·71617819525	„
6	„	9·25941383430	„
7	„	10·80264947335	„
8	„	12·34588511240	„
9	„	13·88912075145	„

MULTIPLES FOR THE CONVERSION OF A GRAIN INTO A DECIGRAM.

1	grain =	·6479891824009	decigram
2	„	1·2959783648018	„
3	„	1·9439675472027	„
4	„	2·5919567296036	„
5	„	3·2399459120045	„
6	„	3·8879350944054	„
7	„	4·5359242768063	„
8	„	5·1839134592072	„
9	„	5·8319026416081	„

7000 grains equal 1 lb. avoirdupois.

TABLE XI.

CONVERSION OF FRACTIONS INTO DECIMALS.

$\frac{1}{64}$	..	..	..	..	..	·015625	$\frac{33}{64}$	..	..	..	..	..	·515625
	$\frac{1}{32}$	..	..	..	..	..	·03125		$\frac{17}{32}$	..	..	..	..	..	·53125
$\frac{3}{64}$	..	..	..	..	..	·046875	$\frac{35}{64}$	..	..	..	..	..	·546875
		$\frac{1}{16}$	..	..	..	..	·0625			$\frac{9}{16}$	..	..	..	..	·5625
$\frac{5}{64}$	..	..	..	..	..	·078125	$\frac{37}{64}$	..	..	..	..	..	·578125
	$\frac{3}{32}$	..	..	..	..	..	·09375		$\frac{19}{32}$	..	..	..	..	..	·59375
$\frac{7}{64}$	..	..	..	..	..	·109375	$\frac{39}{64}$	..	..	..	..	..	·609375
			$\frac{1}{8}$	..	..	..	·125					$\frac{5}{8}$	..	..	·625
$\frac{9}{64}$	..	..	..	..	..	·140625	$\frac{41}{64}$	..	..	..	..	..	·640625
	$\frac{5}{32}$	..	..	..	..	..	·15625		$\frac{21}{32}$	..	..	..	..	..	·65625
$\frac{11}{64}$	..	..	..	..	..	·171875	$\frac{43}{64}$	..	..	..	..	..	·671875
		$\frac{3}{16}$	..	..	..	..	·1875			$\frac{11}{16}$	..	..	..	..	·6875
$\frac{13}{64}$	..	..	..	..	..	·203125	$\frac{45}{64}$	..	..	..	..	..	·703125
	$\frac{7}{32}$	..	..	..	..	..	·21875		$\frac{23}{32}$	..	..	..	..	..	·71875
$\frac{15}{64}$	..	..	..	..	..	·234375	$\frac{47}{64}$	..	..	..	..	..	·734375
				..	$\frac{1}{4}$	..	·25						$\frac{3}{4}$	..	·75
$\frac{17}{64}$	..	..	..	..	..	·265625	$\frac{49}{64}$	..	..	..	..	..	·765625
	$\frac{9}{32}$	..	..	..	..	..	·28125		$\frac{25}{32}$	..	..	..	..	..	·78125
$\frac{19}{64}$	..	..	..	..	..	·296875	$\frac{51}{64}$	..	..	..	..	..	·796875
		$\frac{5}{16}$	..	..	..	..	·3125			$\frac{13}{16}$	..	..	..	..	·8125
$\frac{21}{64}$	..	..	..	..	..	·328125	$\frac{53}{64}$	..	..	..	..	..	·828125
	$\frac{11}{32}$	..	..	..	..	..	·34375		$\frac{27}{32}$	..	..	..	..	..	·84375
$\frac{23}{64}$	..	..	..	..	..	·359378	$\frac{55}{64}$	..	..	..	..	..	·859375
			$\frac{3}{8}$	..	..	..	·375					$\frac{7}{8}$	..	..	·875
$\frac{25}{64}$	..	..	..	..	..	·390625	$\frac{57}{64}$	..	..	..	..	..	·890625
	$\frac{13}{32}$	..	..	..	..	..	·40625		$\frac{29}{32}$	..	..	..	..	..	·90625
$\frac{27}{64}$	..	..	..	..	..	·421875	$\frac{59}{64}$	..	..	..	..	..	·921875
	$\frac{7}{16}$	..	..	..	..	..	·4375			$\frac{15}{16}$	..	..	..	..	·9375
$\frac{29}{64}$	..	..	..	..	..	·453125	$\frac{61}{64}$	..	..	..	..	..	·953125
	$\frac{15}{32}$	..	..	..	..	..	·46875		$\frac{31}{32}$	..	..	..	..	..	·96875
$\frac{31}{64}$	..	..	..	..	..	·484375	$\frac{63}{64}$	..	..	..	..	..	·984375
					$\frac{1}{2}$	..	·5								

FIXED GOLD AND SILVER PARS OF EXCHANGE.

It is absolutely requisite to work the exchanges of intermediaries in decimals of weights of standard substances or of monetary signs. To secure perfect accuracy in large transactions, work done in six decimal places is requisite. At present fractions are largely, if not exclusively, used. Take two illustrations from the British monetary system and use. The bases of the exchanges in the British Isles is the sovereign, 113·001605 grains of pure gold. The nearest fraction having a power of two for its denominator to ·001605 is $\frac{1}{512}$ths of one

grain, the decimal for which is ·0019531. The British monetary sign for the mint issue weight of pure gold in the French franc is 9·515688 pence. The nearest fraction having a power of two for its denominator to ·515688 is $\frac{33}{64}$ths, which is ·515625. Take the French monetary sign for the mint issue weight of the sovereign, 25f. 22·15328c.; the nearest fraction to ·15328 is $\frac{5}{32}$nds, which is ·15625.

TABLE XII.

FIXED GOLD PARS OF EXCHANGE.

No. 1.—EGYPTIAN PIASTRES FOR

	Piastres.		Piastres.
1 British pound	98·452	9. Japanese yen	10·084
2. Turkish pound	88·936	10. Dutch guilder	8·131
3. Portuguese milrei	21·858	11. Chilian condor	7·384
4. Uruguay peso	20·923	12. British Indian rupee	6·563
5. U.S.A. dollar	20·230	13. Scandinavian crown	5·421
6. Argentine peso	19·517	14. German mark	4·819
7. Brazilian milrei	11·049	15. Aus.-Hungarian crown	4·099
8. Russian rouble	10·408	16. French franc	3·903

No. 2.—BRITISH PENCE FOR

	Pence.		Pence.
1. Egyptian pound	243·768	9. Japanese yen	24·582
2. Turkish pound	216·803	10. Dutch guilder	19·823
3. Portuguese milrei	53·284	11. Chilian condor	17·999
4. Uruguay peso	51·004	12. British Indian rupee	16·000
5. U.S.A. dollar	49·316	13. Scandinavian crown	13·216
6. Argentine peso	47·578	14. German mark	11·747
7. Brazilian milrei	26·934	15. Aus.-Hungarian crown	9·992
8. Russian rouble	25·372	16. French franc	9·515

No. 3.—TURKISH PIASTRES FOR

	Piastres.		Piastres.
1. Egyptian pound	112·439	9. Japanese yen	11·338
2. British pound	110·699	10. Dutch guilder	9·143
3. Portuguese milrei	24·577	11. Chilian condor	8·302
4. Uruguay peso	23·525	12. British Indian rupee	7·380
5. U.S.A. dollar	22·746	13. Scandinavian crown	6·096
6. Argentine peso	21·945	14. German mark	5·418
7. Brazilian milrei	12·423	15. Aus.-Hungarian crown	4·609
8. Russian rouble	11·703	16. French franc	4·389

No. 4.—PORTUGUESE REIS FOR

	Reis.		Reis.
1. Egyptian pound	4574·93	9. Japanese yen	461·34
2. British pound	4504·12	10. Dutch guilder	372·02
3 Turkish pound	4068·79	11. Chilian condor	337·81
4. Uruguay peso	957·21	12. British Indian rupee	300·27
5. U.S.A. dollar	925·52	13. Scandinavian crown	248·03
6. Argentine peso	892·91	14. German mark	220·47
7. Brazilian milrei	505·49	15. Aus.-Hungarian crown	187·53
8. Russian rouble	476·17	16. French franc	178·58

No. 5.—URUGUAYAN CENTESIMOS FOR

	Centesimos.		Centesimos.
1. Egyptian pound	477·94	9. Japanese yen	48·19
2. British pound	470·54	10. Dutch guilder	38·86
3. Turkish pound	425·08	11. Chilian condor	35·29
4. Portuguese milrei	104·47	12. British Indian rupee	31·37
5. U.S.A. dollar	96·69	13. Scandinavian crown	25·91
6. Argentine peso	93·28	14. German mark	23·03
7. Brazilian milrei	52·81	15. Aus.-Hungarian crown	19·59
8. Russian rouble	49·74	16. French franc	18·65

No. 6.—UNITED STATES AMERICA CENTS FOR

	Cents.		Cents.
1. Egyptian pound	494·307	9. Japanese yen	49·846
2. British pound	486·656	10. Dutch guilder	40·196
3. Turkish pound	439·620	11. Chilian condor	36·50
4. Portuguese milrei	108·047	12. British Indian rupee	32·443
5. Uruguay peso	103·424	13. Scandinavian crown	26·798
6. Argentine peso	96·476	14. German mark	23·821
7. Brazilian milrei	54·616	15. Aus.-Hungarian crown	20·262
8. Russian rouble	51·449	16. French franc	19·295

No. 7.—ARGENTINE CENTAVOS FOR

	Centavos.		Centavos.
1. Egyptian pound	512·361	9. Japanese yen	51·666
2. British pound	504·431	10. Dutch guilder	41·664
3. Turkish pound	455·677	11. Chilian condor	37·832
4. Portuguese milrei	111·993	12. British Indian rupee	33·628
5. Uruguay peso	107·201	13. Scandinavian crown	27·777
6. U.S.A. dollar	103·652	14. German mark	24·691
7. Brazilian milrei	56·611	15. Aus.-Hungarian crown	21·002
8. Russian rouble	53·328	16. French franc	20·000

No. 8.—BRAZILIAN REIS FOR

	Reis.		Reis.
1. Egyptian pound	9050·48	9. Japanese yen	912·65
2. British pound	8910·40	10. Dutch guilder	735·96
3. Turkish pound	8049·20	11. Chilian condor	668·279
4. Portuguese milrei	1978·27	12. British Indian rupee	594·02
5. Uruguay peso	1893·63	13. Scandinavian crown	490·67
6. U.S.A. dollar	1830·94	14. German mark	436·15
7. Argentine peso	1766·42	15. Aus.-Hungarian crown	370·99
8. Russian rouble	942·00	16. French franc	353·28

No. 9.—RUSSIAN COPECKS FOR

	Copecks.		Copecks.
1. Egyptian pound	960·767	9. Japanese yen	96·884
2. British pound	945·896	10. Dutch guilder	78·127
3. Turkish pound	854·475	11. Chilian condor	70·942
4. Portuguese milrei	210·007	12. British Indian rupee	63·059
5. Uruguay peso	201·021	13. Scandinavian crown	52·088
6. U.S.A. dollar	194·366	14. German mark	46·300
7. Argentine peso	187·517	15. Aus.-Hungarian crown	39·383
8. Brazilian milrei	106·156	16. French franc	37·503

No. 10.—JAPANESE SENS FOR

	Sens.		Sens.
1. Egyptian pound	991·666	9. Russian rouble	103·216
2. British pound	976·317	10. Dutch guilder	80·640
3. Turkish pound	881·955	11. Chilian condor	73·223
4. Portuguese milrei	216·761	12. British Indian rupee	65·087
5. Uruguay peso	207·486	13. Scandinavian crown	53·763
6. U.S.A. dollar	200·617	14. German mark	47·789
7. Argentine peso	193·548	15. Aus.-Hungarian crown	40·650
8. Brazilian milrei	109·570	16. French franc	38·709

No. 11.—DUTCH CENTS FOR

	Cents.		Cents.
1. Egyptian pound	1229·745	9. Russian rouble	127·996
2. British pound	1210·711	10. Japanese yen	124·008
3. Turkish pound	1093·695	11. Chilian condor	90·803
4. Portuguese milrei	268·801	12. British Indian rupee	80·714
5. Uruguay peso	257·299	13. Scandinavian crown	66·670
6. U.S.A. dollar	248·781	14. German mark	59·262
7. Argentine peso	240·015	15. Aus.-Hungarian crown	50·409
8. Brazilian milrei	135·876	16. French franc	48·003

No. 12.—CHILIAN CENTAVOS FOR

	Centavos.		Centavos.
1. Egyptian pound	1354·296	9. Russian rouble	140·959
2. British pound	1333·334	10. Japanese yen	136·567
3. Turkish pound	1204·466	11. Dutch guilder	110·128
4. Portuguese milrei	296·025	12. British Indian rupee	88·888
5. Uruguay peso	283·359	13. Scandinavian crown	73·423
6. U.S.A. dollar	273·978	14. German mark	65·265
7. Argentine peso	264·324	15. Aus.-Hungarian crown	55·515
8. Brazilian milrei	149·638	16. French franc	52·865

No. 13.—BRITISH INDIAN RUPEES AND ANNAS FOR

	Rupees.		Rupees.
1. Egyptian pound	15·23582	10. Japanese yen	1·536385
2. British pound	15·	11. Dutch guilder	1·238941
3. Turkish pound	13·55024	12. Chilian condor	1·124999
4. Portuguese milrei	3·33028		Annas.
5. Uruguay peso	3·187793	13. Scandinavian crown	13·216
6. U.S.A. dollar	3·082257	14. German mark	11·747
7. Argentine peso	2·973649	15. Aus.-Hungarian crn.	10·022
8. Brazilian milrei	1·683426	16. French franc	9·515
9. Russian rouble	1·585797		

No. 14.—SCANDINAVIAN CROWNS AND ORES FOR

	Crowns.		Crowns.
1. Egyptian pound	18·445	10. Japanese yen	1·86
2. British pound	18·15951	11. Dutch guilder	1·499904
3. Turkish pound	16·40437	12. Chilian condor	1·361962
4. Portuguese milrei	4·031757	13. British Indian rupee	1·210634
5. Uruguay peso	3·85925		Ores.
6. U.S.A. dollar	3·731485	14. German mark	88·8887
7. Argentine peso	3·6	15. Aus.-Hungarian crn.	75·6097
8. Brazilian milrei	2·038012	16. French franc	72·0000
9. Russian rouble	1·919819		

No. 15.—GERMAN MARKS AND PFENNIGS FOR

	Marks.		Marks.
1. Egyptian pound	20·75066	10. Japanese yen	2·092503
2. British pound	20·42948	11. Dutch guilder	1·687395
3. Turkish pound	18·45495	12. Chilian condor	1·532210
4. Portuguese milrei	4·535733	13. British Indian rupee	1·361965
5. Uruguay peso	4·341662	14. Scandinavian crown	1·125002
6. U.S.A. dollar	4·197927		Pfennigs.
7. Argentine peso	4·050006	15. Aus.-Hungarian crn.	85·06111
8. Brazilian milrei	2·292767	16. French franc	81·00012
9. Russian rouble	2·159800		

No. 16.—Austria-Hungarian Crowns and Hellers for

	Crowns.		Crowns.
1. Egyptian pound	24·395	10. Japanese yen	2·46
2. British pound	24·01741	11. Dutch guilder	1·983744
3. Turkish pound	21·69611	12. Chilian condor	1·801305
4. Portuguese milrei	5·332323	13. British Indian rupee	1·601161
5. Uruguay peso	5·104169	14. Scandinavian crown	1·322581
6. U.S.A. dollar	4·935189	15. German mark	1·175625
7. Argentine peso	4·761290		Hellers.
8. Brazilian milrei	2·695436	16. French franc	95·22581
9. Russian rouble	2·539116		

No. 17.—French Francs for

	Francs.		Francs.
1. Egyptian pound	25·61806	9. Russian rouble	2·666415
2. British pound	25·22154	10. Japanese yen	2·583333
3. Turkish pound	22·78385	11. Dutch guilder	2·0832
4. Portuguese milrei	5·599662	12. Chilian condor	1·891614
5. Uruguay peso	5·360069	13. British Indian rupee	1·684136
6. U.S.A. dollar	5·182618	14. Scandinavian crown	1·388889
7. Argentine peso	5·	15. German mark	1·234566
8. Brazilian milrei	2·830573	16. Aus.-Hungarian crown	1·050136

Fixed Silver Pars of Exchange.

No. 1.—Shanghae Cash for

	Cash.		Cash.
1. Mexican peso	730·39	7. Russian rouble	537·80
2. Japanese yen	725·01	8. Siamese tical	438·23
3. Javanese rixdollar	706·01	9. Austrian florin	332·04
4. Philippine dollar	698·21	10. British Indian rupee	319·51
5. Columbian sol	672·39	11. Persian kran	123·81
6. Bolivian boliviano	605·15		

No. 2.—Mexican Centavos for

	Centavos.		Centavos.
1. Shanghae tael	136·81	7. Russian rouble	73·63
2. Japanese yen	99·26	8. Siamese tical	60·00
3. Javanese rixdollar	96·66	9. Austrian florin	45·46
4. Philippine dollar	95·59	10. British Indian rupee	43·74
5. Columbian sol	92·06	11. Persian kran	16·95
6. Bolivian boliviano	82·85		

No. 3.—JAPANESE SENS FOR

	Sens.		Sens.
1. Shanghae tael . .	137·92	7. Russian rouble . .	74·17
2. Mexican peso . . .	100·74	8. Siamese tical . .	60·45
3. Javanese rixdollar . .	97·38	9. Austrian florin . .	45·80
4. Philippine dollar . .	96·30	10. British Indian rupee .	44·07
5. Columbian sol . .	92·74	11. Persian kran . .	17·07
6. Bolivian boliviano . .	83 46		

No. 4.—JAVANESE CENTS FOR

	Cents.		Cents.
1. Shanghae tael . .	141·64	7. Russian rouble . .	76·17
2. Mexican peso . . .	103·45	8. Siamese tical . .	62·07
3. Japanese yen . . .	102·69	9. Austrian florin . .	47·03
4. Philippine dollar . .	98·89	10. British Indian rupee .	45·25
5. Columbian sol . .	95·23	11. Persian kran . .	17·53
6. Bolivian boliviano . .	85·71		

No. 5.—PHILIPPINE CENTAVOS FOR

	Centavos.		Centavos.
1. Shanghae tael . .	143·22	7. Russian rouble . .	77·02
2. Mexican peso . . .	104·61	8. Siamese tical . .	62·76
3. Japanese yen . . .	103·84	9. Austrian florin . .	47·55
4. Javanese rixdollar . .	101·11	10. British Indian rupee .	45·76
5. Columbian sol . .	96·30	11. Persian kran . .	17·73
6. Bolivian boliviano . .	86·67		

No. 6.—COLUMBIAN CENTESIMOS FOR

	Centesimos.		Centesimos.
1. Shanghae tael . .	148·72	7. Russian rouble . .	79·98
2. Mexican peso . .	108·62	8. Siamese tical . .	65·17
3. Japanese yen . .	107·82	9. Austrian florin . .	49·38
4. Javanese rixdollar . .	105·00	10. British Indian rupee .	47·52
5. Philippine dollar . .	103·84	11. Persian kran . .	18·41
6. Bolivian boliviano . .	90·00		

No. 7.—BOLIVIAN CENTESIMOS FOR

	Centesimos.		Centesimos.
1. Shanghae tael . .	165·24	7. Russian rouble . .	88·87
2. Mexican peso . .	120·69	8. Siamese tical . .	72·42
3. Japanese yen . . .	119·80	9. Austrian florin . .	54·87
4. Javanese rixdollar . .	116·66	10. British Indian rupee .	52·80
5. Philippine dollar . .	115·38	11. Persian kran . .	20·46
6. Columbian sol . .	111·11		

No. 8.—Russian Copecks for

	Copecks.		Copecks.
1. Shanghae tael	185·94	7. Bolivian boliviano	112·52
2. Mexican peso	135·81	8. Siamese tical	81·49
3. Japanese yen	134·81	9. Austrian florin	61·74
4. Javanese rixdollar	131·28	10. British Indian rupee	59·41
5. Philippine dollar	129·83	11. Persian kran	23·02
6. Columbian sol	125·03		

No. 9.—Siamese Ticals and Phai-nungs for

	Ticals.		Ticals.
1. Shanghae tael	2·2818	7. Bolivian boliviano	1·3809
2. Mexican peso	1·6666	8. Russian rouble	1·2272
3. Japanese yen	1·6543		Shahis.
4. Javanese rixdollar	1·6110	9. Austrian florin	15·1536
5. Philippine dollar	1·5932	10. British Indian rupee	14·5818
6. Columbian sol	1·5343	11. Persian kran	5·7032

No. 10.—Austrian Florins and Kreutzers for

	Florins.		Florins.
1. Shanghae tael	3·0116	7. Bolivian boliviano	1·8225
2. Mexican peso	2·1996	8. Russian rouble	1·6196
3. Japanese yen	2·1334	9. Siamese tical	1·3198
4. Javanese rixdollar	2·1262		Kreutzers.
5. Philippine dollar	2·1027	10. British Indian rupee	96·226
6. Columbian sol	2·025	11. Persian kran	37·286

No. 11.—British Indian Rupees and Annas for

	Rupees.		Rupees.
1. Shanghae tael	3·1297	7. Bolivian boliviano	1·8939
2. Mexican peso	2·2859	8. Russian rouble	1·6831
3. Japanese yen	2·2691	9. Siamese tical	1·3715
4. Javanese rixdollar	2·2096	10. Austrian florin	1·0392
5. Philippine dollar	2·1852		Annas.
6. Columbian sol	2·1044	11. Persian kran	6·1998

No. 12.—Persian Krans for

	Krans.		Krans.
1. Shanghae tael	8·0769	7. Bolivian boliviano	4·8878
2. Mexican peso	5·8993	8. Russian rouble	4·3437
3. Japanese yen	5·8588	9. Siamese tical	3·5399
4. Javanese rixdollar	5·7024	10. Austrian florin	2·6816
5. Philippine dollar	5·6394	11. British Indian rupee	2·5807
6. Columbian sol	5·4308		

CONSTANTS TO DETERMINE THE MONETARY SIGNS FOR THE GOLD EQUIVALENT TO SILVER, AND THE SILVER EQUIVALENT TO GOLD BY THE APPLICATION, TO THEM OF THE RATIO OF THE DAY BETWEEN THE METALS.

The following 204 gold monetary signs for the world's chief standard silver moneys of account are obtained by dividing the mint issue weight of pure silver in each chief silver standard money of account by the mint issue weight of pure gold in each chief gold standard money of account. The result divided by the ratio of the day gives the absolute par between a gold and a silver monetary system, or, in other words, determines the equivalent in gold for the silver at the ratio of the day.

The 204 silver monetary signs for the world's chief gold standard moneys of account are obtained by dividing the mint issue weight of pure gold in each chief gold standard money of account by the mint issue weight of pure silver in each chief silver standard money of account. The result multiplied by the ratio of the day gives the absolute par between a silver and a gold monetary system, or in other words, determines the equivalent in silver for the gold at the ratio of the day.

As an example :—It is desired to know the equivalent in France to a Mexican dollar at the ratio of thirty-four parts of silver to one part of gold. In Table XIII. page 83 under French centime and against Mexico 8418·5 will be found.

The sum is—

8418·5 centimes ÷ 34 ratio = centimes 247 : Ans.

Check this by the unit of weight system. Divide the weight of the Mexican peso by the ratio, and multiply the result by the French monetary sign for one decigram of gold.

The sum is—

244·4091 weight ÷ 34 ratio × 34·4444 centimes = 247 centimes, or Frs. 2·47 c. : Ans.

As an example :—It is desired to know the Shanghae equivalent to the German mark at thirty-four parts of silver to one

part of gold. In Table XIV. under Shanghae tael and against Germany ·01071 will be found.

The sum is—

·01071 tael or 10·71 cash × 34 ratio = 364·1 cash : Ans.

Check this by the unit of weight system. Multiply the weight of the mark by thirty-four, and that by the Shanghae monetary sign for one decigram.

The sum is—

3·584 weight × 34 ratio × 2·99 cash = 364·13 cash : Ans.

204 GOLD MONETARY SIGNS BEING PARS BETWEEN THE WORLD'S GOLD AND SILVER INTERMEDIARIES AT ONE PART OF GOLD FOR ONE PART OF SILVER.

TABLE XIII.

		I. Egyptian piastres.	II. British pence.	III. Turkish piastres.
1	Shanghai tael	449·91	1096·78	505·88
2	Mexican dollar	328·62	801·08	369·50
3	Japanese yen	326·20	795·17	366·77
4	Javanese rix-dollar	317·65	774·34	357·16
5	Philippine dollar	314·14	765·78	353·21
6	Columbian sol	302·52	737·46	340·15
7	Bolivian boliviano	272·27	663·72	306·14
8	Russian rouble	241·96	589·84	272·06
9	Siamese tical	197·17	480·65	221·70
10	Austrian crown	149·40	364·18	167·98
11	British Indian rupee	143·75	350·44	161·64
12	Persian kran	55·70	135·79	62·63

	IV. Portuguese reis.	V. Uruguay centesimos.	VI. United States cents.	VII. Argentine centavos.	VIII. Brazilian reis.	IX. Russian copecks.	X. Japanese sens.
1	20,583	2150·3	2223·9	2305·2	40,719	4322·6	4461·7
2	15,034	1570·6	1624·4	1683·8	29,741	3157·2	3258·8
3	14,923	1559·0	1612·4	1671·3	29,522	3133·9	3234·8
4	14,532	1518·2	1570·1	1627·5	28,749	3051·8	3150·0
5	14,371	1501·4	1552·8	1609·5	28,431	3018·1	3115·2
6	13,840	1445·9	1495·4	1550·0	27,380	2906·5	3000·0
7	12,456	1301·3	1345·8	1395·0	24,642	2615·9	2700·0
8	11,070	1156·4	1196·0	1239·7	21,899	2324·7	2399·5
9	9,020	942·4	974·6	1010·2	17,845	1894·4	1955·3
10	6,835	714·0	738·5	765·4	13,521	1435·3	1481·5
11	6,577	687·1	710·6	736·5	13,011	1381·1	1425·6
12	2,548	266·2	275·3	285·4	5,041	535·2	552·4

	XI. Dutch cents.	XII. Chilian centavos.	XIII. British Indian annas.	XIV. Scandinavian ores.	XV. German pfennigs.	XVI. Austria-Hungarian hellers.	XVII. French centimes.
1	5532·8	6093·2	1096·78	8298·7	9336·1	10,975·7	11,526·0
2	4041·2	4450·4	801·08	6061·3	6819·0	8,016·6	8,418·5
3	4011·4	4417·6	795·17	6016·7	6768·8	7,957·5	8,356·5
4	3906·3	4301·9	774·34	5859·0	6591·4	7,749·0	8,137·5
5	3863·1	4254·4	765·78	5794·3	6518·6	7,663·4	8,047·6
6	3720·2	4097·0	737·46	5580·0	6277·5	7,380·0	7,750·0
7	3348·2	3687·3	663·72	5022·0	5649·8	6,642·0	6,975·0
8	2975·5	3276·9	589·84	4463·0	5020·9	5,902·7	6,198·6
9	2424·7	2670·2	480·65	3636·8	4091·4	4,809·9	5,051·1
10	1837·1	2023·2	364·18	2755·5	3100·0	3,644·4	3,827·2
11	1767·8	1946·9	350·437	2651·5	2983·0	3,506·9	3,682·7
12	685·0	754·4	135·79	1027·5	1155·9	1.358·9	1.427·0

TABLE XIV.

204 SILVER MONETARY SIGNS BEING PARS BETWEEN THE WORLD'S SILVER AND GOLD INTERMEDIARIES AT ONE PART OF SILVER TO ONE PART OF GOLD.

			I. Shanghae tael.	II. Mexican peso.	III. Japanese yen.	IV. Javanese rix-dollar	V. Philippine dollar.	VI. Columbian peso.	VII. Bolivian bolinano.	VIII. Russian rouble.	IX. Siamese tical.	X. Austrian florin.	XI. British Indian rupee.	XII. Persian kran.
1	Egypt	pound	·22226	·30430	·30656	·31481	·31833	·33055	·36728	·41328	·50717	·66937	·69562	1·7952
2	British Isles ..	„	·21882	·29959	·30182	·30994	·31340	·32544	·36160	·40689	·49932	·65901	·68485	1·7674
3	Turkey	„	·19767	·27064	·27265	·27998	·28311	·29398	·32665	·36756	·45106	·59532	·61866	1·5966
4	Portugal	milrei	·04858	·06652	·06701	·06881	·06958	·07225	·08028	·09034	·11086	·14631	·15205	·39210
5	Uruguay	peso	·04650	·06366	·06414	·06587	·06660	·06916	·07685	·08647	·10612	·14005	·14555	·37561
6	United States, N.A.	dollar	·04496	·06156	·06202	·06369	·06440	·06687	·07430	·08361	·10260	·13542	·14073	·36317
7	Argentine Republic	peso	·04338	·05939	·05983	·06144	·06213	·06452	·07168	·08066	·09899	·13064	·13577	·35038
8	Brazil	milrei	·02456	·03362	·03387	·03478	·03517	·03652	·04058	·04566	·05604	·07396	·07686	·19835
9	Russia	rouble	·02313	·03167	·03191	·03277	·03313	·03441	·03823	·04302	·05279	·06967	·07240	·18685
10	Japan	yen	·02241	·03368	·03091	·03175	·03210	·03333	·03704	·04167	·05114	·06750	·07015	·18103
11	Netherlands ..	guilder	·01807	·02474	·02493	·02560	·02588	·02688	·02987	·03361	·04124	·05443	·05657	·14598
12	Chili	condor	·01641	·02247	·02264	·02325	·02351	·02441	·02712	·03052	·03745	·04943	·05136	·13256
13	British India ..	rupee	·01459	·01997	·02012	·02066	·02089	·02170	·02411	·02712	·03329	·04393	·04566	·11783
14	Scandinavia ..	crown	·01205	·01649	·01662	·01707	·01726	·01792	·01991	·02241	·02750	·03629	·03771	·09733
15	Germany	mark	·01071	·01466	·01477	·01517	·01534	·01593	·01770	·01992	·02444	·03226	·03352	·08651
16	Austria-Hungary ..	crown	·009111	·01247	·01257	·01290	·01305	·01355	·01505	·01694	·02079	·02744	·02851	·07359
17	France	franc	·008676	·01187	·01197	·01229	·01243	·01290	·01434	·01613	·01980	·02613	·02715	·07008

272 RATES OF EXCHANGE BETWEEN 17 BRONZE TOKENS IN EFFECTIVE GOLD CURRENCIES AND 132 RATES OF EXCHANGE BETWEEN 12 BRONZE TOKENS IN EFFECTIVE SILVER CURRENCIES.

Bronze token coins in effective gold and silver currencies are never intended to do their work at the cost value of them. The State obtains great profit by making them. Each bronze coin is a token for a definite weight of the pure standard metal in the chief money of account of each monetary system, as one penny the 240th part of a British pound sterling, one centime the 100th part of a French franc. Prices are quoted in pence, centimes, cents, copecks, centesimos, cash, pies, atts, &c. Everyone should be able to convert a price in bronze tokens of one country into the bronze tokens of all other countries the currencies of which consist of the same standard metal. On pages 74-80, automatic fixed gold and silver pars of exchange are given. The bronze tokens for each chief money of account dealt with in these pages are as follows:— I. Egyptian pound, 1000 ochr-el-guerches; II. British pound, 240 pence; III. Turkish pound, 4000 paras; IV. Portuguese milrei, 1000 reis; V. Uruguayan peso, 100 centesimos; VI. United States dollar, 100 cents; VII. Argentine centavo, 100 cents; VIII. Brazilian milrei, 1000 reis. IX. Russian rouble, 100 copecks; X. Japanese yen, 100 sens; XI. Dutch guilder, 100 cents; XII. Chilian condor, 100 centavos; XIII. British Indian rupee, 192 pies; XIV. Scandinavian crown, 100 ores; XV. German mark, 100 pfennigs; XVI. Austria-Hungarian crown, 100 hellers; XVII. French francs, 100 centimes.

I. Shanghae tael, 1000 cash; II. Mexican peso, 100 centavos; III. Japanese yen, 100 sen; IV. Javanese rix-dollar, 100 cents; V. Philippine dollar, 100 centavos; VI. Columbian sol, 100 centesimos; VII. Bolivian boliviano, 100 centesimos; VIII. Russian rouble, 100 copecks; IX. Siamese tical, 64 atts; X.

Austria-Hungarian florin, 100 kreutzers; XI. British Indian rupee, 192 pies; XII. Persian kran, 1000 dinars.

It is noticeable that of these 25 different bronze tokens there are 5, viz. Egyptian, Portuguese, Brazilian, Chinese, and Persian, of 1000 each, to make the chief money of account; there are 16, viz. Uruguayan, United States, Argentine, Russian, Japanese, Dutch, Chilian, Scandinavian, German, Austria-Hungarian, French, Mexican, Javanese, Philippinese, Columbian, and Bolivian, of 100 each, to make the chief money of account. For these 21 systems the tables on pages 74-80 serve to give the exchange of two bronze tokens. Let us take two examples of the use of these tables, one in which the divisor is 1000 and the other in which it is 100 bronze tokens.

I. What is the Egyptian equivalent to a cent of the United States? No. 1 of page 47 under Egyptian and against United States 20·230 piastres is found; there are 10 ochr-el-guerches to one piastre; by the removal of the decimal point one figure to the right 202·30 ochr-el-guerches is arrived at; this divided by 100 cents in the United States dollar shows that one U.S.A. cent is equivalent to 2·023 ochr-el-guerches.

II. What is the Dutch equivalent to a German pfennig? On page 76 under Dutch and against German mark 59·262 cent is found, the division of this by 100, i.e. the removal of the decimal two figures to the left, gives ·5926 cent as the equivalent to the German mark.

III. What is the German equivalent to a Dutch cent? On page 77 under German mark and against Dutch guilder 1·687395 mark is found; the removal of the decimal two figures to the right gives 168·739 pfennigs; this divided by 100 makes the Dutch cent equal to 1·687 pfennigs.

Check this last answer by the unit of weight system. The Dutch cent is the 100th part of a guilder, the guilder at mint issue weight is 6·048 decigrams of pure gold, the 100th of this is ·06048; this multiplied by the German monetary sign for one decigram gives the sign for one pfennig.

The sum is—

·06408 × 27·9 pfennigs = 1·687 pfennig.—Ans.

Tables for Turkey, the British Isles, British India, and Siam are appended.

	XV. For the Turkish para.	XVI. For the British penny.	XVII. For the British Indian pie
I. Egypt, och-el-guerch ..	·223	4·102	·3431
II. British Isles, penny ..	·05420	—	·08333
III. Portugal, rei	1·1260	18·77	1·564
IV. Uruguay, centesimo ..	·1062	1·960	·1634
V. United States, cent ..	·1099	2·028	·1690
VI. Argentina, cent.. ..	·1139	2·102	·1751
VII. Brazil, rei	2·0123	37·130	3·093
VIII. Russia, copeck	·2136	3·941	·3286
IX. Japan, sen	·2205	4·068	·3390
X. Holland, cent	·2734	5·045	·4204
XI. Chile, centavo	·3011	5·555	·4630
XII. British India, pie ..	·6504	12·000	—
XIII. Scandinavia, ore ..	·4101	7·563	·6305
XIV. Germany, pfennig ..	·4613	8·512	·7093
XV. Austria-Hungary, heller	·5424	10·007	·8340
XVI. France, centime.. ..	·5696	10·509	·8770
Turkey, para		18·449	·1538

	XVIII. For the Siamese att.		XVIII. For the Siamese att.
I. Shanghae, cash ..	6·847	VII. Bolivia, centesimos	1·1315
II. Mexico, centavos..	·9375	VIII. Russia, copecks ..	1·2732
III. Japan, sens ..	·9445	IX. Austria, kreutzers	2·0622
IV. Java, cents ..	·9700	X. British India, pies	4·1145
V. Philippines, centavos	·9817	XI. Persia, dinars ..	55·306
VI. Columbia, centesimos	1·0183		

XIX.—SIXTEEN GOLD PARS WITH THE BRITISH SHILLING.

I. Egypt	4·9226	ochr-el-guerch.
II. Turkey	221·40	paras.
III. Portugal	225·20	reis
IV. Uruguay	23·527	centesimos.
V. United States	24·333	cents
VI. Argentina	25·221	centavos.
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